MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Principle to Petroleum Engineering			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	PRPE112				
ECTS Credits	4				
SWL (hr/sem)	125				
Module Level		UGI	**Semester of Delivery**		1
Administering Department		PE	**College**	OGE	
Module Leader	Fadhil S.K. Al-Sharshahy		**e-mail**	fadhilkadhim47@yahoo.com	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	NA		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	English Language I	**Semester**	1

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- Identify the basics of oil and gas industry 2- This course aims to get familiar with the abbreviations and terminology used in the oil industry 3- Explain all operations that related to explore, drill, completion and produce oil

	wells as well as post-production procedures like well stimulation and production enhancement.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	To Understand the fundamentals of the petroleum industry, which including: 1- Petroleum & Crude Oil Definition 2- Petroleum Formation Theories 3- Petroleum exploration methods 4- Oil and gas drilling operation and drilling fluid types 5- Identify oil and gas reservoirs, types of oil and the nature of oil formations 6- Well completion and Productionoperations 7- post-production operations like well stimulation and artificial lift 8- Drive Mechanisms, secondary recovery and enhance oil recovery 9- Get familiar with the key abbreviations and terminology used in the oil industry.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: **Part I: fundamentals of petroleum engineering** Petroleum &crude oil definition, API (American Petroleum Institute), associated gas and non-associated gas, The reservoir classification, biogenic and the abiotic theories for petroleum formation, rock types and petroleum history. (24hrs) **Part II: Oil and gas well operations** Drilling operation, drilling fluid types and benefits, well logging and formation evaluation, well cementing and casing, perforation techniques and production operation. (28 hrs) **Part III: post-production operation** Enhance oil recovery by using artificial lift techniques, secondary and tertiaryrecovery techniques. (8 hrs)

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to Encourage students to ask and answer questions, as well as presenting many explanatory videos to increase students' knowledge, since most of the equipment and facilities for the oil industry are not available in daily life and it is difficult to see them, and also to introduce the student to the most important petroleum terms, abbreviations and symbols that he will need to complete the rest of the academic stages Or to work in the future as an oil engineer.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	4, 11	1,2,3,4 and 5
	Assignments	2	10% (10)	3, 10	1,2,3,4 and 5
	Projects /	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	1,2,3,4,5 and 6
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	1,2,3,4 and 5
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Petroleum & Crude Oil Definition
Week 2	Petroleum Formation Theories
Week 3	Petroleum exploration methods
Week 4	Drilling Engineering
Week 5	Drilling Fluids
Week 6	Cable-tool drilling & Rotary Drilling
Week 7	Reservoir Engineering
Week 8	Reservoir fluids properties
Week 9	Petrophysical rock properties
Week 10	Formation evaluation & well logging
Week 11	Well Completion
Week 12	Production Engineering
Week 13	Oil and gas separators
Week 14	Artificial lift
Week 15	Drive Mechanisms, secondary recovery and enhance oil recovery
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	-Dalvi, Samir (2015). Fundamentals of Oil & Gas Industry for Beginners. - John R. Fanchi (2017). Introduction to Petroleum Engineering. - Moshood Sanni (2018). Petroleum Engineering: Principles, Calculations, and Workflows	No
Recommended Texts	- Ahmed, Tarek (2010). Reservoir Engineering Handbook.	yes
Websites	https://guides.loc.gov/oil-and-gas-industry https://www.drillingformulas.com/ https://glossary.slb.com/en/search#sort=relevancy	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information
معلومات المادة الدراسية

Module Title	Calculus I			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CALC113				
ECTS Credits	**5**				
SWL (hr/sem)	**150**				
Module Level	UGI		**Semester of Delivery**	1	
Administering Department	PE		**College**	OGE	
Module Leader	Muaid		**e-mail**	E-mail	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	PHD	
Module Tutor	2		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1-Developing and strengthening students' problem-solving skills. In particular, students 2- Teaching them to read, write, speak, and think in the language of mathematics. 3-Learning how to apply calculus tools to a variety of problem situations.
Module Learning Outcomes	1- Developing and strengthening students' problem-solving skills. In particular, students 2- Teaching them to read, write, speak, and think in the language of mathematics.

مخرجات التعلم للمادة الدراسية	3- Learning how to apply calculus tools to a variety of problem situations.
Indicative Contents المحتويات الإرشادية	• The area of mathematics known as calculus is primarily concerned with limits, functions, derivatives, trigonometric functions, and infinite series. An important component of modern mathematics education in this subject.Using derivatives to solve related rates problems • Using derivatives to approximate points (linearization) • Evaluating limits using L'Hopital's law • Locating critical points using the first derivative • Identifying increasing/decreasing values using the first derivative • Locating critical points using the second derivative • Identifying concavity and inflection points using the second derivative • Using the first/second derivative tests to find local and global extrema • Using derivatives to solve optimization problems

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Give emphasis on conceptual understanding. • Set challenging homework that expands on what you learned in class. • Cooperative learning techniques should be used. • Ask thoughtful questions. • Concentrate on logical thinking and actual problem-solving. • Use a variety of assessment methods.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects /	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Exponential and logarithm functions
Week 2	Application of Exponential and logarithm functions
Week 3	The relationship between the Exponential function and the logarithm function
Week 4	Trigonometric functions
Week 5	The inverse of Trigonometric functions
Week 6	Hyperbolic functions
Week 7	The inverse of Hyperbolic functions
Week 8	Derivative
Week 9	Implicit differentiation Exponential functions derivative
Week 10	Maximum and Minimum using Derivatives
Week 11	The logarithm functions derivative
Week 12	Derivative of hyperbolic functions
Week 13	Applications of differentiation
Week 14	Increasing and decreasing functions
Week 15	**Preparatory week before the final Exam**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	George B. Thomas, "THOMAS' CALCULUS ", Eleventh Edition 2011, Dorling Kindersley (India). • Murry R. Spiegel," Mathematical Handbook of formulas and tables",1968.	
Recommended Texts	• 2-Ford , S.R. and Ford , J.R. " Calculus " , (1963) McGraw-Hill. • 3-K.Back house and S.P.T. Houldsworth " Pure Mathematics a First Course " (1979) , S1 Edition , Longman Group .	
Websites	• https://tutorial.math.lamar.edu/classes/calci/calci.aspx • https://learn.saylor.org/course/MA005	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information
معلومات المادة الدراسية

Module Title	**English Language I**		**Module Delivery**	
Module Type	**Suplement**		**Theory Lecture**	
Module Code	**ENLA111**			
ECTS Credits	**2**			
SWL (hr/sem)	**100**			
Module Level	1	**Semester of Delivery**	1	
Administering Department	Type Dept. Code	**College**	OGE	
Module Leader	Dr. Najem Al-Rubaiey	**e-mail**	100108@uotechnology.edu.iq	
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.	
Module Tutor	None	**e-mail**	None	
Peer Reviewer Name	Dr. Fadhil S. Kadhim	**e-mail**	150010@uotechnology.edu.iq	
Review Committee Approval	01/06/2023	**Version Number**	1.0	

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, this syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students. In English classes, the focus is going to be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, we are going to use the prescribed text for detailed study. The students are encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

	The course will help to: ➢ Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills. ➢ Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus. ➢ Develop study skills and communication skills in formal and informal situations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Use English Language effectively in spoken and written forms. 2. Comprehend the given texts and respond appropriately. 3. Communicate confidently in various contexts and different cultures. 4. Acquire basic proficiency in reading and listening, writing and speaking skills.
Indicative Contents المحتويات الإرشادية	Key skills taught will include: The basic structure and style of an academic essay. How to read texts more quickly and more critically, and how to use their ideas in written and oral arguments. What to listen out for in lectures and how to take more effective notes. How to participate more confidently in group discussion work. Improving accuracy in speaking and writing. Using a wider range of vocabulary to express your views more clearly. Giving formal presentations
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Vocabulary building. This is an important component of any English class. This strategy focuses a portion of each classroom session on building a better vocabulary. Writer's workshop. Have students participate in a writer's workshop several times each year. The writing workshop model allows students to learn about and participate in all aspects of the writing process: drafting, revision, editing and publishing. Peer response and editing. This can be a very valuable teaching strategy for both the teacher and the student, and there are many peer response strategies to try in class. Students get a chance to think critically about others' writing and see the results their classmates got from a writing assignment.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	10	10% (10)	1- 10	LO # 1-4
	Assignments	5	10% (10)	11-14	LO # 1-4
	Projects	1	10% (10)	Continuous	LO # 1, 2
	Report	1	10% (10)	15	LO # 3
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO # 1-4
	Final Exam	2hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	An international industry
Week 2	Oil & Gas –Upstream
Week 3	Oil and Gas –Downstream
Week 4	Oil and Gas: Safety First

Week 5	Finding Oil and Gas
Week 6	Drilling
Week 7	Pipes and Pipelines
Week 8	Working Offshore
Week 9	Natural Gas
Week 10	Oil and the Environment
Week 11	Workshop operations
Week 12	Repairs and maintenance
Week 13	The refinery
Week 14	Emergencies
Week 15	Petrochemicals
Week 16	**Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	English for Oil and Gas #1 (Oxford English for Careers: Oil and Gas, Lewis Lansford, D'Arcy Vallance, Jon Naunton, and Alison Pohl. Oxford University Press.).	Yes
Recommended Texts	English for Oil and Gas #2 (Oxford English for Careers: Oil and Gas, Lewis Lansford, D'Arcy Vallance, Jon Naunton, and Alison Pohl. Oxford University Press.).	No
Websites	https://t.me/+qmKQz0lBjq8zYWQy	

GRADING SCHEME مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information
معلومات المادة الدراسية

Module Title	Computer Programming I	**Module Delivery**	
Module Type	**Support or related learning activity**		☒ **Theory**
Module Code	COPR115		☐ **Lecture**
ECTS Credits	**5**		☒ **Lab**
SWL (hr/sem)	**125**		☐ **Tutorial**
			☐ **Practical**
			☐ **Seminar**

Module Level	UGI	**Semester of Delivery**	1
Administering Department	PE	**College**	OGE
Module Leader	**Salam A. Thajeel**	**e-mail**	E-ailsalam.a.thajil@uotechnology.edu.iq
Module Leader's Acad. Title	Asst. Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	NA	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	is an inevitable part of commerce education. The course is aiming to equip all the commerce aspirants to have basic skills as well as hands on experience on word processing, for creating excel spreadsheets, for building databases through the use of Microsoft Office Word, Excel, and VBA .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- To familiarize students with the use of Microsoft Word 2- To familiarize students with the use of MS Excel 3- To familiarize students with the use of Excel Visual basic application

Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Part I: fundamentals of Microsoft word In Part 1 we will provide students with the skills to create documents using Microsoft Word. It will also provide knowledge of how to create your own document for work, college, or home. Students will learn the basics, creating documents, formatting text, adding graphics, images, Word chart, and many other features available. You will see a full list of course content below. You'll also cover charts and tables, as well as using forms and mail merge. Part II: fundamentals of Microsoft Excel this part provides all the tools necessary to create and use basic spreadsheets. Participants will receive an overview of the interface and learn the various methods for entering and editing data. Additionally, participants will learn the various ways to write formulas, Create Worksheets and Workbooks, data analysis, create charts. Apply Custom Data Formats and Layouts, and others which will used to streamline reporting, turn raw data into presentation-ready graphs or chart. where One of the most common uses of Excel in petroleum engineering is for organizing and analyzing data related to well production data. Part III: Visual basic Application In Part 3 we will provide students with the skills to create & develop vb applications, where that allow Engineers to develop engineering applications that run in the Windows environment. VB provides the engineer a programming tool to write simple programs quickly that meet their needs. Example programs written using VB include gas and oil fluid correlations, interpolation software, gas well bottom hole pressure from surface conditions, volumetric reserve calculations, simple log analysis, water pattern analysis and bottom hole pressure analysis.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to Encourage students to ask and answer questions, as well as training students to implement many practical exercises in the laboratory (which covers most of what is studied in theoretical lectures), which in turn gives students the ability to carry out the work required of them in the future in their practical life.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	• Microsoft Word Create and Manage Documents: Create a Document, Navigate Through Document, Format a Document, Customize Options and Views for Documents, Print and save documents.
Week 2	Format Text, Paragraphs, and Sections: Insert Text and Paragraphs, Format Text and Paragraphs, Order and Group Text and Paragraphs
Week 3	Create Tables and Lists: Create a Table, modify a Table, Create and Modify a List.
Week 4	Insert and Format Graphic Element: Insert GraphicElements, FormatGraphic Elements, Insert and Format SmartArt Graphics
Week 5	**Microsoft Excel** :Manage Workbook Options and Setting: Create Worksheets and Workbooks,

	Navigate in Worksheets and Workbooks, Format Worksheets and Workbooks, Customize Options and Views for Worksheets and Workbook, Configure Worksheets and Workbooks for Distribution
Week 6	Apply Custom Data Formats and Layouts: Apply Custom Data Formats and Validation, Apply Advanced Conditional Formatting and Filtering, Create and Modify Custom Workbook Elements,Create Table: Create and Manage Table, Manage Table Styles and Options, Filter and Sort a Table
Week 7	Perform Operations with Formulas and Functions: Summarize Data by using Function, . Perform Conditional Operations by using Functions, Format and Modify Text by using Functions
Week 8	Create Charts and Objects: Create Charts, Format Charts, . Insert and Format Object,Manage Workbook Options and Settings
Week 9	**Excel VBA:**Introducing Visual Basic for Applications Displaying the Developer TabintheRibbonRecording a Macro
Week 10	Working with Procedures and Functions: Understanding Modules Creating a Standard Module,UnderstandingProcedures,Creating a Sub Procedure Calling Procedures,Using the Immediate Window to Call Procedures Creating a Function Procedure
Week 11	Understanding Objects: Understanding Objects,Navigating the Excel Object HierarchyUnderstandingCollections,Using the Object Browser,Working with PropertiesUsing the With Statement,Working with Methods
Week 12	Using Expressions, Variables, and Intrinsic Functions: Understanding Expressions and Statements,Declaring,Variables,UnderstandingDataTypes,Working with Variable Scope
Week 13	Controlling Program Execution: Understanding Control-of-Flow Structures Workingwith Boolean Expressions,Using the If...End If Decision Structures,Using the Select Case...End Select Structure
Week 14	,Using the Do...Loop Structure,Using the For...To...Next Structure,Using the For Each...Next Structure
Week 15	Working with Forms and Controls: Understanding UserForms,Using the Toolbox Working with UserForm Properties, Events, and Methods,, Understanding Controls
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	practical exercises to Create and Manage Documents: Save & open document, Format a Document, Customize Options and Views for Documents, Print and save as documents.
Week 2	practical exercises about the Format Text, Paragraphs, and Sections: Insert Text and Paragraphs, FormatText and Paragraphs, Order and Group Text and Paragraphs
Week 3	practical exercises to Create Tables and Lists: Create a Table, modify a Table, Create and Modify a List.
Week 4	Insert and Format Graphic Element: Insert Graphic Elements, Format Graphic Elements, Insert and Format SmartArt Graphics(practical exercises + homework)
Week 5	(practical exercises +homework) about Microsoft Excel :introduction to interface , Create Worksheets and Workbooks, Import data from a delimited text file ▪ Add a worksheet to an existing workbook ▪ Copy and move a worksheet
Week 6	practical exercises to :▪ Change worksheet tab color ▪ Rename a worksheet ▪ Change worksheet order ▪ Insert and delete columns or rows ▪ Change workbook themes▪ Adjust row height and column width ▪ Insert headers and footers
Week 7	practical exercises with homework about Customize Options and Views for Worksheets and Workbooks:▪ Hide or unhide worksheets ▪ Hide or unhide columns and rows ▪ Customize the Quick Access toolbar ▪ Modify document properties ▪ Display formulas
Week8	(practical exercises +homework)to Create Charts and Objects: Create Charts, Format Charts, . Insert and Format Object,Manage Workbook Options and Settings
Week9	Excel VBA:Introducing Visual Basic for Applications Displaying the Developer Tab in the Ribbon Recording a Macro(practical)
Week10	(practical exercises +homework):about Working with Procedures and Functions: Creating a Sub ProcedureCalling Procedures, Creating a Function Procedure
Week11	Using Expressions, Variables, and Intrinsic Functions: Understanding Expressions and Statements,Declaring,Variables,UnderstandingDataTypes,Working with Variable Scope(practical exercises + homework)
Week12	Working with Boolean Expressions, Using the If...End If Decision Structures, Using the Select Case...End Select Structure(practical exercises + homework):

Week13	Working with Do...Loop Structure,Using the For...To...Next Stru Working with Boolean Expressions, Using the If...End If Decision Structures, Using the Select Case...End Select Structure Working with Boolean Expressions, Using the If...End If Decision Structures, Using the Select Case...End Select Structure cture,Using the For Each...Next Structure(practical exercises + homework)
Week14	Working with Forms and Controls: How insert data to Worksheets and Workbooks, create function, perform arithmetic operation using VBA (practical exercises + homework)
Week15	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Microsoft Office for Beginners,by , M.L. Humphrey, 2020. • MICROSOFT WORD & POWERPOINT FOR BEGINNERS & POWER USERS 2021: The Concise Microsoft Word & PowerPoint A-Z Mastery Guide for All Users Paperback by Tech Demystified,2021. • Microsoft Excel 2019 VBA and Macros ,By Bill Jelen, Tracy Syrstad · 2019	Yes No No
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information			
Module Title	Workshops		Module Delivery
Module Type	Support		☐ Theory ☐ Lecture ☐ Lab ☐ Tutorial ■ Practical ☐ Seminar
Module Code	WORSH11		
ECTS Credit/year	4		
SWL/year	200		
Module level	1	Semester of Delivery	1, 2
Module Leader	Training and Workshops Center (Hadeel Fawzi Jasim)	College	
Module Leader Academic Title	Prof.	e-mail	twc@uotechnology.edu.iq 10532@uotechnology.edu.iq
Module Tutor		Module Leader's Qualification	Ph.D.
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/6/2023	e-mail	
		Version Number	1

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	1-Preparing applied engineers in the field of engineering sciences who are distinguished by a high level of knowledge and technological creativity, in line with the strict standards adopted globally in quality assurance and academic accreditation of the corresponding engineering programs, while adhering to the ethics of the engineering profession. 2. Enable the student to know and understand work systems, risks, and the factors surrounding them. 3. Enable the student to know and understand theoretical principles in handicrafts and measurements.
Module Learning Outcomes	1- To familiarize the student with the vocabulary of occupational safety and its importance in the field of work. 2- Acquisition of the student's manual operation skills, for example (Filings and Tinsmith workshops), and mechanical operation skills, for example (Turning). 3- Acquisition of the student's mechanical forming skills, for example (Casting

	and Blacksmithing). 4- The student acquires basic engineering skills such as Welding, Carpentry, and Electrical installations that serve him in the professional field. 5- Enabling the student to operate the various machines and devices in mechanical operations and formation. 6- Cooperative learning by working collectively.
Inductive Contents	1. Introducing the student to the basics of the art of turning and milling, types of cold working machines, the skill of dealing with them, choosing metals, operational tools, and methods of measurement and standardization 2. Introducing the student to the basics of the art of casting, hot forming, metal selection, method of working on casting furnaces and tools, and manufacturing casting molds 3. Familiarize students with the basics of cars and the systems they use, as well as maintenance, disassembly, and assembly processes. 4. Introducing students to the basics of household and industrial electrical appliances, the skill of using tools, and designing electrical circuits and control panels 5. Introducing the student to the basics of the art of plumbing, leveling surfaces, the skill of using tools, manufacturing and installing geometric shapes, and methods of measurement and standardization 6. Introducing the student to the basics of the art of blacksmithing, cold and hot forming of metals, the method of hardening them, and the skills of dealing with hand tools, forming machines, and heating furnaces 7. Introducing the student to the basics of the art of filing and manual operation of metals with the help of manual, electrical, and mechanical tools, the skills of dealing with them, and the methods of measurement and standardization 8. Introducing the student to the basics of the art of welding, the installation and assembly of metals, the types of welding machines, the skills of dealing with them, the types of welding, and the methods of measurement and standardization 9. Introducing the student to the basics of the art of carpentry and woodworking with the help of manual, electrical, and mechanical tools, the skills of dealing with them, and methods of measurement and standardization

Student Workload (SWL)			
Structured SWL (h/sem)	93	Structured SWL (h/w)	6.00
Unstructured SWL (h/sem)	7	Unstructured SWL (h/w)	0.46
Total SWL (h/sem)	100		
Structured SWL (h/year)	186	Structured SWL (h/w)	6.00
Unstructured SWL (h/year)	14	Unstructured SWL (h/w)	0.46
Total SWL (h/year)	200		

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes				
	Assignments				All
	Projects / Practice	Every 3 weeks	60%	Continuous	
	Report				
Summative Assessment	Midterm Exam				
	Exam	Every 3 weeks	40%	Continuous	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Welding workshop. -Occupational safety and its importance in welding workshops. -Introduction to the basics of welding. -Electric arc exercise. -An exercise for welding straight lines in a circular motion (helical).
Week 2	Welding workshop - An exercise for welding straight lines with a crescent movement and other

	welding methods -Construction welding exercise.
Week 3	Welding workshop. -Welding two pieces together. -Written exam in practical exercises. -
Week 4	Casting workshop -Occupational safety and its importance in plumbing workshops. -Introduction to the basics of metal casting. -Simple wooden disc exercise. Half workout.
Week 5	Casting workshop Wheel exercise. Pushing arm exercise.
Week 6	Casting workshop. -Complete pulley exercise. -Circular pole exercise. -Written exam in practical exercises.
Week 7	Blacksmith Workshop -Occupational safety and its importance in blacksmithing workshops. -Introduction to the Basics of Blacksmithing. - Barbell adjustment exercise. -Eight-star exercise. - Exercise forming the number eight in English. -Six formation exercises in English.
Week 8	Blacksmith Workshop -An exercise forming the number five in English. - Exercise forming the number nine in English. . -An exercise in forming an iron model in the form of a circle
Week 9	Blacksmith Workshop

	- S-shape exercise. - Air hammer hot barbell exercise. - Exercise to form a circle on an electric bending machine. - Exercising cold and hot ornament formation. . - A written exam in practical exercises
Week 10	Automotive Workshop -Occupational safety and its importance in car maintenance workshops. -An introduction to cars and their basic parts. -Parts of the engine, how it works, types of engines, and methods of classification.
Week 11	Automotive Workshop - Open the engine and identify the parts -Lubrication system -Cooling system.
Week 12	Automotive Workshop -The fuel system. -The old and new ignition circuits. -Written exam in practical exercises.
Week 13	Turning Workshop -Introduction to lathe machines and identifying their parts -Measuring tools and the use of an oven measuring instrument -Circular column lathing exercise on different diameters.
Week 14	Turning Workshop -Exercise using the pen (semicircular R) brackets. An exercise in making different angles using a pen (square + angle pen 55).
Week 15	Turning Workshop - Making shaft with different diameter exercises using (left and right pen) - Workout (Tube Connection). -Written exam in practical exercises.

Week 16	Fitting workshop Occupational safety and its importance in filing workshops -An introduction to the basics of filing -Pen holder exercise “preparation and preparation”
Week 17	Fitting workshop Pencil holder exercises finishing and assembling.
Week 18	Fitting workshop -The catcher exercise. - Clamping exercise. Written exam in practical exercises.
Week 19	Carpentry workshop -Occupational safety and its importance in carpentry workshops. - An introduction to carpentry, its types, types of wood, tools used, and preparation Preparing the tools used Face modification exercise using the reindeer
Week 20	Carpentry workshop Garden fence work and how to connect its parts, the eight-star exercise
Week 21	Carpentry workshop - Wood smoothing exercise using smoothing paper - Wood dyeing exercise in three stages Final smoothing and varnishing exercise Written exam in practical exercises
Week 22	The tinsmith workshop Occupational safety and its importance in plumbing workshops An introduction to plumbing, its tools, and plumbing stages Planning and marking exercise on metal plates
Week 23	Thetinsmithworkshop Geometric shapes

	Types of individuals and methods of individuals Geometric shape individuals exercise on a metal board
Week 24	Thetinsmithworkshop Cone members exercise - Exercise of cylinders with an oblique cut Roll forming operations Connection without the use of an intermediary Written exam in practical exercises
Week 25	Electric Workshop Occupational Safety and its importance in electrical workshops An introduction to the basics of electrical installations - Linking a simple circuit consisting of a lamp to the control of a single-way switch. Connect two lamps in series with one-way switch control. Connecting two lamps in parallel with the control of a single road switch. Connect two lights with one-way dual switch control.
Week 26	electric Workshop Connect a fluorescent lamp circuit to a one-way switch control Connecting an electric supply socket circuit to the control of a separate or combined one-way switch Written exam in practical exercises
Week 27	electric Workshop Occupational Safety and its importance in blacksmithing workshops Introduction to the basics of Blacksmithing - Barbell adjustment exercise Eight-star exercise - Exercise forming the number eight in English Exercise forming the number six in English
Week 28	supplementary training curriculum Welding workshop

	Plumbing workshop Blacksmith's workshop
Week 29	supplementary training curriculum - Automotive workshop - Turning workshop Fitting workshop
Week 30	supplementary training curriculum Carpentry workshop The plumbing workshop electric Workshop

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	Workshop technology and measurements, Ahmed Salem Al-Sabbagh,	yes
Recommended Texts		
Websites		

Module Information معلومات المادة الدراسية					
Module Title	Engineering Mechanics and Strength of Material			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	EMSM114				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGI		**Semester of Delivery**	1	
Administering Department	PE		**College**	OGE	
Module Leader	Ali Ati		**e-mail**	E-mail	
Module Leader's Acad. Title	Asst. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	NA		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This module covers two main parts: •Fundamental principles, about the motion, velocity, newton's laws, statistic inertia, fluid inertia, sliding fraction, rolling fraction and help the student to solve and understand the problems. •Strength of material is the discipline of investigating the relationships that exist between the structures and properties of materials. Engineering material is designing

	or engineering the structure of a material to produce a predetermined set of properties. This part covers principles of stress and strain. Develops understanding of force, heat deformation, material properties, allowable strength, young modulus Poisson ratio. It also covers hook laws, shear stress, Moher circles, and the general strain energy equation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- The program prepares students for research and development in many frontier areas of engineering, including such as newton's laws, statistic and dynamic mechanic. 2-All students study the core theoretical subjects of fluid mechanics, dynamics, supplemented by courses in mathematics. 3- The program can be tailored to a student's interests through electives in engineering, mechanic or other applied sciences. 4The program learn students the fundamental concepts of stress and strain. 5- Explain the concepts of shear and bearing stress. 6- Learn the Allowable force and safety factor for design materials. 7- Analysis and draw the Mohr's circle with bending diagrams
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: **Part I: fundamentals of Engineering Mechanics** principles, about the motion, velocity, newton's laws, statistic inertia, fluid inertia, sliding fraction, rolling fraction and help the student to solve and understand the problems. . (24 hrs) **Part II: Strength of materialfundamentals** principles of stress and strain. Develops understanding of force, heat deformation, material properties, allowable strength, young modulus Poisson ratio. It also covers hook laws, shear stress, Moher circles, and the general strain energy equation. (28 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to Encourage students to ask and answer questions, as well as presenting many experimental work labs to increase students' knowledge.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	90	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week	Newton’s laws
Week	Types of the Fractions
Week	Velocity, velocity and accelerations
Week	Plane curvilinear motion (x-y) coordinate
Week	Plane curvilinear motion (n-t) coordinate
Week	Plane curvilinear motion (r-θ) coordinate
Week	Curvilinear motion
Week	stress, strain, Relationship between stress and strain.
Week	Study the concept of Shear Stress, Bearing Stress and Shear Strain.
Week	Allowable working stress factor of safety and the Thermal Stress and Strain.
Week	Elastic Constants (young modulus, Poisson ratio, shear modulus and bulk modulus).
Week	Principle stress (maximum and minimum stress).
Week	Mohr’s circle and Principal strain.

Week	Drawing the shear force and bending moment diagrams, Theory of shearing stress in beams.
Week	Study the Beams, types and subject loads, Theory of bending stress in beams with calculations
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Tensile test
Week 2	Hardness test
Week 3	Impact test
Week 4	Particles size analysis
Week 5	Properties of engineering materials with regular shape test
Week 6	Properties of engineering materials with irregular shape test
Week 7	Study the passivity phenomenon test
Week 8	Torsion test
Week 9	Bending test
Week 10	Deflection of beam test
Week 11	Determination of moisture content
Week 12	Calculation of water formation test

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Engineering Mechanics: Statics & Dynamics 14th Edition Engineering Mechanics - Statics and Dynamics Book by A. Bedford and Wallace Fowler	
Recommended Texts	Hibbeler Dynamics Engineering Mechanics: Statics & Dynamics by Russell C. Hibbeler Philpot, Timothy A., and Jeffery S. Thomas. Mechanics of materials: an integrated learning system. John Wiley & Sons, 2020.	

	Timoshenko, Stephen. History of strength of materials: with a brief account of the history of theory of elasticity and theory of structures. Courier Corporation, 1983.	
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information معلومات المادة الدراسية					
Module Title	General Geology I			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	GEGE117				
ECTS Credits	**4**				
SWL (hr/sem)	**150**				
Module Level		UGI	**Semester of Delivery**		1
Administering Department		PE	**College**	OGE	
Module Leader	Dr. Mayssaa Ali Al-Bidry		**e-mail**	mayssaa.a.abdwon @uotechnology.edu.iq	
Module Leader's Acad. Title		Assist. prof.	**Module Leader's Qualification**		PHD
Module Tutor	NA		**e-mail**	E-mail	
Peer Reviewer Name		Dr. Fadhil S. Kadhim	**e-mail**	150010@uotechnology.edu.iq	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	**1-Facilitate a better understanding of Earth rock formation, rocks types, process and factors affect on Earth crust.** **2-Provide students with the tools to interpret the minerals and rock types and fossil record.** **3-Laboratory exercises and field trips will highlight and enhance the concepts learned in the classroom.**
Module Learning Outcomes	**1-Identify various types of minerals and rocks and understand the geologic processes of their formation, structural deformation and the process of weathering and erosion.** **2-Describe the mechanisms that produced the earth's major continents, mountain ranges, ocean basins, plate tectonics and deformation of earth crust.**

مخرجات التعلم للمادة الدراسية	**3-Discuss geologic history in the context of understanding Earth systems and how they may change in the future.**
Indicative Contents المحتويات الإرشادية	**The most important skills required by the student are:** **1- Understanding the geological processes that formed the Earth and its layers and minerals.** **2 - The effects leading to the change of rock types as a result of the effects of all types of erosion and weathering.** **3- The basic structural influences that changed the shape of the earth's crust and their results in generating various types of folds and faults.** **4- Studying the basic factors of deposition situationof sedimentary rocks and knowing their geological ages.**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**The possibility of identifying the various types of minerals and rocks through which the student can evaluate the contents of the earth's crust and how oilaccumilations are formed inside the earth and the mechanisms of their extraction through knowledge of the hardness and strength of these rocks, their depth and sedimentary age, geological structures sub-surface and the quality of oil reservoirs.**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	90	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	50	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	10% (10)	1-3	LO #1-3
	Assignments	1	10% (10)	4-6	LO # 1-3
	Projects /	1	10% (10)	7-9	LO # 1-3
	Report	1	10% (10)	10-12	LO # 1-3
Summative	**Midterm Exam**	1hr	10% (10)	1-7	LO # 1-3

assessment	**Final Exam**	2hr	50% (50)	16	LO # 1-3
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Geology , types of geological sciences, Why Study Geology? Rocks and Fossils are important tools for geologists that tell a story of what Earth like in the past.
Week 2	Earth generation and Earth's Internal Structure , Crust, Mantel and Core. Define their physical and chemical properties , Why Does Oceanic Crust Form Ocean Basins and Continental Crust Form the Continents?
Week 3	Matter and Minerals, what are the minerals and how can they be formed? Minerals are the building blocks of rocks Earth's crust is made of rocks. Mineral Composition. Chemical bonding forming a compound as mineral. Rock-Forming Minerals the Silicates and non-Silicates.
Week 4	Silicate Mineral Structures, Environment of Formation, Bowen's Reaction Series, Physical Properties of Minerals.
Week 5	Types of Rocks. What Can Igneous Minerals/Rocks Tell Us? Origin of Igneous Rocks. How Do Igneous Rocks Form? How Does Magma Originate? Generating Magma from Solid Rock. Components of Magma.
Week 6	Origin of Magma Compositions, Origin of Andesitic Magmas Origin of Granitic Magmas, Classification of Igneous Rocks, Igneous Textures, Rate of Cooling, Mineral Compositions of Igneous Rocks
Week 7	Igneous Activity, Not all Volcanic Eruptions are the Same, Factors Affecting Viscosity, Materials Extruded from Volcanoes, Anatomy of Volcanoes, Types of Volcanoes , Plutonic Igneous Activity, Classification of Plutons.
Week 8	Metamorphic Rocks, What Can Metamorphic Minerals and Rocks Tell Us? Metamorphism, Agents of Metamorphism, Classification of Metamorphic Rocks, How Metamorphism Alters Rocks, Types of Foliation and Foliated Metamorphic Rocks, Metamorphic Environments
Week 9	Sedimentary Rocks, Turning Sediment into Rock, Diagenesis, Types of Sedimentary Rocks, Classification of Sedimentary Rocks, Characteristics of Detrital Sedimentary Rocks,
Week 10	Grain Size , What Does Grain Size Tell Us? Sorting, What Does the Degree of Sorting Tell Us?Chemical and Biochemical Sedimentary Rocks, Inorganic Processes including Evaporation, Hydrothermal, Chemical Activity and Organic Processes of Biochemical Origin.
Week 11	Types of Chemical and Biochemical Sedimentary Rocks. Carbonate Rocks, Characteristics of the Environment of Marine Carbonate Formation. Sedimentary Environments of Deposition, Depositional Environments.
Week 12	Weathering and Erosion, Mechanical & Chemical Weathering, Products of Weathering, Erosion, types of Mechanical Weathering, types of Chemical Weathering, Factors Influencing Rates of Weathering
Week 13	Crustal deformation and Geologic Structures, Deformation, Deformational Stress, How Do Rocks Deform? Crustal Structures, Anatomy of a Fold, Common Types of Folds,
Week 14	Types of Faults, Summary of Fault Types, Dip-Slip Faults and Strike-Slip Faults, Types of Strike-Slip Faults , Fault-Associated Folding
Week 15	Geological time , geological coloum.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Introduction and Crystallography.**
Week 2	**Types of crystal system and their properties.**
Week 3	**Types of minerals , silicates and non silicate and study their physical properties.**
Week 4	**Igneous rocks , their types and composition and textures.**
Week 5	**Metamorphic rocks , their types, textures, and types of metamorphism.**
Week 6	**Sedimentary rocks , their types and classification, detrital sedimentary rocks.**
Week 7	**Chemical sedimentary rocks and their types.**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**1- Essentials of Geology (Lutgens and Tarbuck, 10th Edition).** **2- Sedimentary Basins Evolution, Facies, and Sediment Budget , By Gerhard Einsele , Springer Science & Business Media, Jul 27, 2000 - Science - 792 pages.** **3- 5- Zumberge's Laboratory Manual for Physical Geology (Robert Rutford and James Carter, 14th Edition.)**	Not sure
Recommended Texts	**The Concise Geologic Time Scale , By james G. Ogg, Gabi Ogg , Felix M. Gradstein , Cambridge University Press, Sep 4, 2008 - Science - 177 pages.**	Not sure
Websites	**The Encyclopedia of Field and General Geology , Charles W. Finkl , Springer Science & Business Media, Apr 30, 1988 - Science 1912 pages.**	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Chemistry			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CHEM121				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGI		**Semester of Delivery**	2	
Administering Department	PE		**College**	OGE	
Module Leader	Rana Abbas Azeez		**e-mail**	Email:Rana.A.Azeez@uotechnology.edu.iq	
Module Leader's Acad. Title	Ass. Prof.		**Module Leader's Qualification**	M.Sc.	
Module Tutor	NA		**e-mail**	E-mail	
Peer Reviewer Name	Dr. Najem Al-Rubaiey		**e-mail**	E-mail :100108@uotechnology.edu.iq	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Principles of Chemistry is a course designed to provide a general chemistry background to environmental studies majors. Chemistry is a rapidly growing field and is essential in understanding our natural environment. Having a basic knowledge on the atom and its structure, the way atoms connect to form molecules, the properties of chemical substances and the way they react helps students understand the science in their everyday life and provides an essential background and tool for students. Additionally, it provides knowledge of organic substances and compounds - that is, those that contain carbon in their molecular structure, along with other elements such as hydrogen, nitrogen, oxygen, and sulfur. As well as, it will provides with the principles of green technologies and a deep understanding of sustainability issues that will lead to the reduction or elimination of hazardous substances involved in the design, manufacture and application of chemical products. Also examine the environmental, economic and social benefits arising from the transformation of the chemical industries of the future.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-Know the fundamentals of the physical and chemical properties of matter, and explain the theoretical principles and important applications of classical analytical methods. 2-Classify and give the nomenclature of organic compounds , and explain in details the qualitative and quantitative aspects of organic compounds 3-Students will be able to explain why chemistry is an integral activity for addressing economic, and environmental problems.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following:** **Part I: General Chemistry** In this part explains that the chemistry is the branch of science that deals with the properties, composition, and structure of elements and compounds, how they can change, and the energy that is released or absorbed when they change**Part II : Analytical Chemistry** In this part It is designed to provide a basic overview of analytical chemistry, as a field responsible for characterizing the composition of matter, in qualitative terms (what is there) and Quantitatively (how much is present). Nearly all chemists routinely make qualitative or quantitative measurements. **Part III. Organic Chemistry** In this part II is designed to provide a fundamental overview of organic

	chemistry to students interested in pursuing a career in the sciences. It is focusing primarily on the basic principles to understand the structure, properties, composition, and preparation (by Synthesis or by other means) of Carbon-based compounds, Hydrocarbons, and their derivatives. These compounds may contain any number of other elements, including Hydrogen, Nitrogen, Oxygen, the Halogens as well as Phosphorus, Silicon, and Sulfur, and reactivity of organic molecules. Emphasis is on substitution and elimination reactions and chemistry of the alkyl group. **Part IV sustainable Chemistry** This part it provides an overview of sustainable chemistry and will equip the students with an understanding of how to assess chemical syntheses and processing routes as well as to design sustainable materials and chemicals.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teaching and learning strategies can include a range of whole class, group and individual activities to accommodate different abilities, skills, learning rates and styles that allow every student to participate and to achieve some degree of success.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	90	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	5	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	4	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**What Is Chemistry?** Some Basic Definitions Chemistry as a Science
Week 2	**Atoms, Molecules, and Ions** Atomic Theory Molecules and Chemical Nomenclature Masses of Atoms and Molecules Ions and Ionic Compounds Acids
Week 3	**Chemical Reactions and Equations** The Chemical Equation

	Types of Chemical Reactions: Single- and Double-Displacement Reactions Ionic Equations: A Closer Look Composition, Decomposition, and Combustion Reactions Neutralization Reactions Oxidation-Reduction Reactions
Week 4	**Stoichiometry and the Mole** Stoichiometry The Mole The Mole in Chemical Reactions Mole-Mass and Mass-Mass Calculations
Week 5	**Analytical Chemistry:** Fundamental way of expressing the concentration of solution: -Molality, Normality, Molality and Tutorial
Week 6	**Equilibrium-Constant Expressions** Weak acids and base Dissociation Constants for Conjugate Acid / Base Pairs Relationship between Ka and Kb Hydronium Ion Concentration of Solutions of Weak Acids
Week 7	**Analytical Methods of Analysis:** a-Qualitative Analysis b-Quantitative Analysis **Volumetric Analysis** (Titrimetric) & Analysis, Acid- Base, Redox, Precipitation, Complex Titration, Methods of Calculation, Titration Curves **Gravimetric Analysis** Precipitation Reactions, Direct and Indirect Methods of Analysis, Ksp. Instrumental Methods of Analysis.
Week 8	**Acids and Bases** Arrhenius Acids and Bases Brønsted-Lowry Acids and Bases Acid-Base Titrations Strong and Weak Acids and Bases and Their Salts Auto-ionization of Water.

Week 9	**Buffer Solutions:** Calculating the pH of buffer solutions The Henderson-Hasselbalch Equation Properties of Buffer Solutions The Composition of Buffer Solutions as a Function of pH: Alpha Values Preparation of Buffer
Week 10	**Organic Chemistry:** Classification of organic compounds: -Aliphatic compounds (Akane, Alkene, Alkyne) and cycloalkane -Aromatic compounds -Functional group: Alkyl halide, Alcohols, Ethar, Aldehydes, Ketones, Esters, Carboxylic acids, Thiophen, Disulphide
Week 11	**Aromatic Compounds**: Structural formula of benzene ring, nomenclature, preparation, properties, chemical reaction, nitration, halogenation -Chemical reaction of Toluene, Xylene, Ethyle benzene, Styrene, Aniline.
Week 12	**Hydrocarbons from Petroleum:** Fossil Fuels, Refining, Alkanes from Natural Gas, Crude Oil Refining, Fractional Distillation, Cracking, Octane Number
Week 13	**Green Chemistry** Introduction Pollution Prevention Sustainability/Real world Green Chemistry Renewable energy
Week 14	**Preparatory week before the final Exam**
Week 15	**Final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Introduction of Analytical Chemistry**
Week 2	**Preparation the standard solutions : Primary standard solution and secondary standard solution**
Week 3	**Volumetric Analysis: Titration of hydrochloric acid with sodium carbonate**
Week 4	**Titration of Mixture (base strong and base weak) with acid strong**
Week 5	**Acidity of Vinegar, Quiz**
Week 6	**Introduction of Organic chemistry**
Week 7	**Measurements the physical properties of organic compounds: Boiling point**
Week 8	**Measurements the physical properties of organic compounds: Melting point**
Week 9	**Simple Distillation, Quiz**
Week 10	**Preparation of organic compounds (ester)**
Week 11	**Identification of functional groups :Saturated and Unsaturated Aliphatic Compound.**
Week 12	**Identification of functional groups :Aldehyde and ketone**
Week 13	**Final Examination Lab**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Text book : R.T. Morrison, R.N. Boyd and S.K. Bhattacharjee; "Organic Chemistry" 7th edition, Prentice Hall of India, copy right 2011.	Yes
Recommended	1) R.T. Morrison and R.N. Boyd; "Organic Chemistry" 6th edition Prentice. Hall . Inc, New Jersey (1992).	Yes

Texts	2) K.S. Tewari, S.N. Mehrotra and N.K., Vishnoi; A Text book of Organic Chemistry, Vikas, Pub . Ltd, New Delhi (1979). 3) Douglas A. Skoog, Donald M. West, F. James Holler and Stanley R. Crouch, "Fundamental of Analytical Chemistry", ninth editions, Brooks/cole, 2014 . 4)ary D. Christian, Purnendu K. (Sandy) Dasgupta and Kevin A. Schug, "Analytical Chemistry", Seventh edition, John Wiley & Sons, Inc,2014.	
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	General Geology II			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	GEGE122				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level		UGI	**Semester of Delivery**		2
Administering Department		PE	**College**	OGE	
Module Leader	Dr. Mayssaa Ali Al-Bidry		**e-mail**	mayssaa.a.abdwon @uotechnology.edu.iq	
Module Leader's Acad. Title		Assist. Prof.	**Module Leader's Qualification**		PHD
Module Tutor	NA		**e-mail**	E-mail	
Peer Reviewer Name		Dr. Fadhil S. Kadhim	**e-mail**	150010@uotechnology.edu.iq	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	GEGE117	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims	Sedimentary rock is the branch of geology that deals with sediments and sedimentary rocks. This course covers the principles of sedimentary rocks and their relationship to

أهداف المادة الدراسية	petroleum engineering. Develops an understanding of the type, characterization, formation, and petrophysics characterization of sedimentary rocks It also covers Reservoirs rocks and prediction of Reservoir quality
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1-Identify various types of sedimentary rocks and understand the geologic processes of their formation, structural deformation and the process of weathering and erosion.** **2-Identify characterizaion of sedimentary rocks** **3- importance of sedimentary rock in oil and gas**
Indicative Contents المحتويات الإرشادية	**The most important skills required by the student are:** 1- Explain fundamental concepts relevant to sedimentary rocks 2- Explain the concepts of characterization of sedimentary rocks 3- Explain sandstone and sandstone reservoirs. 4- Explain carbonate rocks and carbonate reservoirs. 5- Explain mudstone and shale and important in petroleum. 6- Explain the concepts of Stratigraphic Column

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**The possibility of identifying the various types of minerals and rocks through which the student can evaluate the contents of the earth's crust and how oil accumilations are formed inside the earth and the mechanisms of their extraction through knowledge of the hardness and strength of these rocks, their depth and sedimentary age, geological structures sub-surface and the quality of oil reservoirs.**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	60	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية				
	Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**

Formative assessment	**Quizzes**	1	10% (10)	1-3	LO #1-3
	Assignments	1	10% (10)	4-6	LO # 1-3
	Projects /	1	10% (10)	7-9	LO # 1-3
	Report	1	10% (10)	10-12	LO # 1-3
Summative assessment	**Midterm Exam**	1 hr	10% (10)	1-7	LO # 1-3
	Final Exam	2hr	50% (50)	16	LO # 1-3
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Sedimentation and sedimentary rocks: Formation of Sedimentary Rocks, Diagenesis, lithification, Classification of sedimentary rocks, Properties of sedimentary rocks (Color, Texture, Fabric, Particles shape, Particles size, Rounding), Mineralogical and geochemical composition, grain size.
Week 2	Grain size: Grain-size scales, Measuring grain size Methods, Mathematical methods to calculation grain size (Average grain size, Grain-size sorting, Skewness).
Week 3	Conglomerate and Breccia: introduction, types of conglomerates and breccias, Composition of clastic conglomerates (Composition of framework clasts, Composition of matrix and cements) , Texture (Matrix content and fabric support, Clast shape and orientation, Sedimentary structures in conglomerates)
Week 4	Classification of conglomerate (Classification by relative clast stability, Classification by clast lithology, Classification by clast size), Conglomerate properties and depositional environments (Sheetflood, Streamflow conglomerates, Wave-worked conglomerates, Tide-worked conglomerates, Meltout/lodgment conglomerates, Subaqueous meltout conglomerates, Subaerial debris-flow conglomerates).
Week 5	Sandstone: Introduction, Minerals composition, Classification of Sandstone, Sandstone diagenesis, Diagenetic Sequences, Porosity and Permeability in sandstone, Factors that decrease the porosity of sandstones
Week 6	Sandstone Reservoirs: Prediction of Reservoir Quality, Early Diagenesis, Redox-Driven Processes on the Seafloor, Consequences for Reservoir Quality, Mechanical Compaction of Loose Sand, Sandstone Reservoirs Buried to Intermediate Depth (2.0–3.5 km, 50–120◦C), Deeply Buried Sandstones (>3.5–4 km, >120◦C), Effect of Oil Emplacement, Prediction of Reservoir Quality
Week 7	Clay and claystone (minerals, texture, physical properties), Silt and siltstone (minerals, texture, physical properties), Mudstone and Shale: introduction, Texture of mudstones and shales, Microfabric, Fissility
Week 8	Classification of shale and mudstone based on texture, Classification based on type of cementation, Classification based on depositional environment, Classification based on organic matter content.
Week 9	Organic matter in shale and mudstone, Mineral composition of mudstone and Shale, Diagenesis and

	hydrocarbons, Importance of Shales to the Petroleum (source rocks, reservoir, cap rocks).
Week 10	Chemical Sedimentary Rocks, Carbonate rocks, introduction, Limestone textures, Matrix/cement (Micrite, Sparry calcite) Pellets, Coated grains, Ooids, Oncoids.
Week 11	Dolostones, Dolomite textures, Depositional classification of carbonates, Dunham classification system of limestones, Modification by Embry and Klovan, classification by Lucia,
Week 12	Depositional Environments of Carbonate Rocks, Carbonates Diagenesis, Dolostone and Dolomitisation, Relationships between Limestone and Dolostone, Carbonate Oil Reservoir Rocks
Week 13	Evaporite Sedimentary Rocks: introduction, Formation of evaporite rocks, Evaporite depositional environments (Marine evaporites, Nonmarine evaporites), Evaporite minerals (Gypsum, Anhydrite, Halite), Evaporite deposits, Diagenesis of evaporites
Week 14	Salt dome, stratigraphic trap, Evaporate cap rock
Week 15	Stratigraphic Column, Structures in Sedimentary Rocks, Stratification (Terminology, Parting, Origin), Cross stratification, Planar stratification (Bedding and Lamination), Graded Bedding, Mud Cracks
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	**contour maps**
Week 2	**stratigraphy maps**
Week 3	**Draw and calculate bed thickness**
Week 4	Stratigraphic Column
Week 5	**Stratigraphic Correlation**
Week 6	**Calculate grain size of sedimentary rocks**
Week 7	**Type rocks and characterization according to grain size**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	1- Shale Rock: Geology, Composition,	Not sure

	Uses.Helmenstine, Anne Marie, Ph.D. (2018). 2- Rocks and minerals. Bonewitz, R. (2012). 2nd ed. London: DK Publishing. 3- A review of their classifications, properties and importance to the petroleum industry Shales.Okeke, O. C., &Okogbue, C. O. (2011).Global Journal of Geological Sciences, 9(1), 75-83. 4- Petrology of Sedimentary rocks / Second Edition / Sam Boggs. Book 2009 5- Petrology of Sedimentary rocks , Sam Boggs, Jr	
Recommended Texts	Geomechanical and petrophysical properties of mudrocks: introduction.Rutter, E., Mecklenburgh, J, Taylor, K.	Not sure
Websites	**The Encyclopedia of Field and General Geology , Charles W. Finkl , Springer Science & Business Media, Apr 30, 1988 - Science 1912 pages.**	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information
معلومات المادة الدراسية

Module Title	Calculus II	**Module Delivery**	
Module Type	**Basic**	☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CALC123		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		

Module Level	UGI	**Semester of Delivery**	2
Administering Department	PE	**College**	OGE
Module Leader	Ameen Kareem Salih	**e-mail**	150101@uotechnology.edu.iq
Module Leader's Acad. Title	Asst. Lecturer.	**Module Leader's Qualification**	MSc
Module Tutor	2	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	CALC113	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	**1-The main objective is to understand the process of integration and its benefits in practical life and to enable the student to solve various problems of integration**

	2-Study different matrices and explain the usefulness of matrices in petroleum industry **3-Study and draw complex numbers so that the student can understand the purpose of complex numbers**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1- Teaching the student, the scientific basis and the benefits of integration** **2- Carry out the integration process using integration methods** **3- Integration of trigonometric and quadrilateral functions** **4- Study definite integration and its applications in calculating areas and volumes** **5- Studying matrices, knowing their properties, mathematical operations related to them, and how to benefit from them in practical life** **6- Studying Complex Number, knowing their properties, mathematical operations related to them, and how to benefit from them in practical life**
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: **Part I: fundamentals of integration** **Technique of Integral, Defined integral, Mode of Integral, Integral the Odd and even powers of sine and cosine.** (10 hrs) **Part II: method of integration** Method of integration: Integration by Part, Integral by trigonometric substitutions, Integral by completing the square, Integral by reducing an improper fraction, Integral by partial fraction Integral by Rational function. (30 hrs) **Part III: Definite Integral** Application of Definite Integral, Areas and Volume. (5 hrs) **Part IIII: Matrices** **Determinants and Introduction to Matrices, Determine the inverse of matrices.** (10 hrs) **Part IIIII: Complex Number** Polar Coordinates, Complex Number, Complex Variables, Draw the complex function. (20 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The major technique for delivering this module will be a lot of homework and solved exercises, as well as attempting to connect mathematical operations to real life for the purpose of enhancing interest and solidifying knowledge.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	4, 11	1,2,3,4 and 5
	Assignments	2	10% (10)	3, 10	1,2,3,4 and 5
	Projects /	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	1,2,3,4,5 and 6
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8	1,2, and 3
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Technique of Integral, Defined integral, Mode of Integral**
Week 2	**Method of integration: Integration by Part**
Week 3	**Integral the Odd and even powers of sine and cosine**
Week 4	**Integral by trigonometric substitutions**
Week 5	**Integral by completing the square**
Week 6	**Integral by reducing an improper fraction**
Week 7	**Integral by partial fraction**
Week 8	**Integral by Rational function**
Week 9	**Application of Definite Integral, Areas and Volume**
Week 10	**Determinants and Introduction to Matrices**
Week 11	**Determine the inverse of matrices**
Week 12	**Polar Coordinates**
Week 13	**Complex Number**
Week 14	**Complex Variables**
Week 15	**Draw the complex function**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Strang, G. (2017). Calculus. United States: Wellesley-	yes

	Cambridge Press.	
Recommended Texts		
Websites	https://www.geogebra.org/3d?lang=en https://www.wolframalpha.com/	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Engineering Practices			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	ENPR124				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	UGI		**Semester of Delivery**	2	
Administering Department	PE		**College**	OGE	
Module Leader	Anwar Nadhom Mohammed Ali		**e-mail**	10605@uotechnology.edu.iq	
Module Leader's Acad. Title	Asst.Pro.		**Module Leader's Qualification**	PHD	
Module Tutor	NA		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Semester includes a display problem of representing the needs of the community using the learning method is based on the problem. The problem, which represents the needs of the community scenario includes a description of the problem is similar to the practical realities and limitations of the data that can be obtained by the engineer to reach a solution based on the research and information collection Presented. The other side includes the use of the computer program (AutoCAD soft.) to draw using the computer to build his skills in the field of engineering drawing and design.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student be able choose the mechanism of data collection to solve the engineering problem. 2. The student be able to determine many of solutions to solve the problem and choose the best. 3. The student be able to search of references using the web to solve the problem in an engineering method depend on mathematic. 4. Students be able to draw by using AutoCAD. 5. Students be able to write the scientific report In an organized and clear manner.
Indicative Contents المحتويات الإرشادية	Indicative Contents will include: Solve problems by using the problems based learning. How to search and reach to the right information. how to take more effective notes. Work as group and how to participate more confidently in group discussion work. Improving accuracy in writing a scientific reports.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Using the problems based learning to give the fallowing Subject-specific skills: 1- Discussion.

	2- Brain storming by encouraging students to produce a large number of ideas about some issue or problem raised during the lecture. 3- Self-learning by teaching the student by his own according to his special abilities and mental and cognitive levels responding to his preferences and interests to achieve development and integration of his capabilities. 4- Cooperative learning by team working. 5- Competitive learning by creating a competition among peers.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	60	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	6,12	LO # 1, and 2
	Assignments	2	10% (10)	2,8	LO # 1, and 2
	Projects /	1	10% (10)	Continuous	All
	Report	2	10% (10)	4,10	LO # 2, 4 and 7

Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Definition the scenario problem in engineering practice, and definition the process of Problem **B**ased **L**earning Method (**PBL**) in Engineering practice.
Week 2	Describe the drawing and modifying tools bar in AutoCAD.
Week 3	The scenario of problem in (**PBL**). The needs of the society (**The Problem scenario**)
Week 4	Discussion the scenario of problem, and determine the start point to solve the problem and how looking for references in the web.
Week 5	Drawing by using rectangular and polar arrays.
Week 6	Describe how write the items of the report of PBL.
Week 7	Advice on writing as a group.
Week 8	Determine the references required to solve problem determine the standard required.
Week 9	Draw different exercises for the layouts with dimensional mode.
Week 10	The scientific presentation items. Explanation of the interface of the power point software.

Week 11	Initial Report of the problem scenario. Discussions Initial Report of the problem scenario.
Week 12	Drawing with dimensions the shape by AutoCAD of the design of the problem scenario.
Week 13	Discussion the initial report of the groups. The first evaluation of student group reports
Week 14	Discussions and evaluating the Final report of groups of students.
Week 15	Discuss and evaluating the final report of the student groups by presenting to the final report using the PowerPoint software.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Randy H. Shih , "AutoCAD 2016 Tutorial First Level 2D Fundamentals", Note: For problem scenario by PBL There is no required text book, however student will have to investigate online and library resources on the design process.	No
Recommended Texts	-	
Websites	http://www.sdcpublications.com	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Engineering Ethics			**Module Delivery**	
Module Type	**Support**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	ENET125				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level		UGI	**Semester of Delivery**		2
Administering Department		PE	**College**	OGE	
Module Leader	Wasem Ali		**e-mail**	E-mail: 150067@uotechnology.edu.iq	
Module Leader's Acad. Title		Asst.Lect.	**Module Leader's Qualification**		MSc
Module Tutor	NA		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This course deals with the understanding and importance of integrity and responsible, ethical and scientific behavior towards engineering work and the most important associations concerned with these important topics and their impact on the future of engineering work
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Develop the student's professional history and engineering development 2- Develop the student's the importance of professional behavior and a sense of responsibility 3- The most important professional associations and codes of ethics
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following:** **Part I: Introduction** • Know why it is important to study engineering ethics • Understand the distinction between professional and personal ethics • See how ethical problem solving and engineering design are similar. **Part II : Professionalism and Codes of Ethics** • Determine whether engineering is a profession •Understand what codes of ethics are, and • Examine some codes of ethics of professional engineering societies. **Part III: Understanding Ethical Problems** • Discuss several ethical theories • See how these theories can be applied to engineering situations. **Part IV: Ethical Problem Solving Techniques** • Apply ethical problem solving methods to hypothetical and real cases • See how flow charting can be used to solve ethical problems • Learn what bribery is and how to avoid it. **Part V: Risk, Safety, and Accidents**

	• Know the definitions of risk and safety • Discover different factors that affect the perception of risk • Study the nature of accidents • Know how to ensure that your designs will be as safe as possible.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teaching and learning strategies can include a range of whole class, group and individual activities to accommodate different abilities, skills, learning rates and styles that allow every student to participate and to achieve some degree of success.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	45	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية				
	Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**

Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects /	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	The Profession of Engineering
Week 2	Professionalism and Codes of Ethics
Week 3	Personal VS. Professional Ethics
Week 4	Understanding Ethical Problems
Week 5	Ethical Theories
Week 6	Utilitarianism
Week 7	Types of Issues in Ethical Problem Solving
Week 8	Line Drawing
Week 9	Flow Charts
Week 10	Ethical Problem-Solving Techniques
Week 11	Risk, Safety, and Accidents.
Week 12	The Rights and Responsibilities of Engineers
Week 13	Ethics in Research and Experimentation
Week 14	Global Issues.
Week 15	**Preparatory week before the final Exam**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- Michael E. Gorman, Matthew M. Mehalik, and Patricia H. Werhane, Ethical end Environmental Challenges to Engineering, Prentice Hall, Englewood Cliffs, NJ, 2000. 2- Kenneth K. Humphreys, What Every Engineering Should Know About Ethics, Marcel Dekker, Inc., New York, 1999. 3- John D. Kemper and Billy R. Sanders, Engineers and Their Profession, 5th ed., Oxford University Press, New York, 2001. 4- Edmund G. Seebauer and Robert L. Barry, Fundamentals of Ethics for Scientists and Engineers, Oxford University Press, New York, 2001.	
Recommended Texts	1- Joe Morgenstern, "The Fifty-nine Story Crisis," The New Yorker Magazine, May 29, 1995, p. 45. 2- Kenneth R. Foster and John E. Moulder, "Are Mobile Phones Safe?" IEEE Spectrum, August 2000, pp.23–28.	
Websites	5- http://radburn.rutgers.edu/andrews/projects/ssit/default.htm 6- http://www.nspe.org/Ethics/EthicsResources/BER/index.html#2009	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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Module Information			
Module Title	**Workshops**		Module Delivery
Module Type	Support		☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**
Module Code	WORK116		
ECTS Credit/year	8		
SWL/year	200		
Module level	1	Semester of Delivery	1, 2
Module Leader	Training and Workshops Center (Hadeel Fawzi Jasim)	College	
Module Leader Academic Title	Prof.	e-mail	twc@uotechnology.edu.iq 10532@uotechnology.edu.iq
Module Tutor		Module Leader's Qualification	Ph.D.
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/6/2023	e-mail	
		Version Number	1

Relation with other Modules			
Prerequisite Module	-	Semester	-
Co-requisite Module	-	Semester	-

Module Aims, Learning Outcomes and Inductive Contents	
Module Aims	1-Preparing applied engineers in the field of engineering sciences who are distinguished by a high level of knowledge and technological creativity, in line with the strict standards adopted globally in quality assurance and academic accreditation of the corresponding engineering programs, while adhering to the ethics of the engineering profession. 2. Enable the student to know and understand work systems, risks, and the

	factors surrounding them. 3. Enable the student to know and understand theoretical principles in handicrafts and measurements.
Module Learning Outcomes	1- To familiarize the student with the vocabulary of occupational safety and its importance in the field of work. 2- Acquisition of the student's manual operation skills, for example (Filings and Tinsmith workshops), and mechanical operation skills, for example (Turning). 3- Acquisition of the student's mechanical forming skills, for example (Casting and Blacksmithing). 4- The student acquires basic engineering skills such as Welding, Carpentry, and Electrical installations that serve him in the professional field. 5- Enabling the student to operate the various machines and devices in mechanical operations and formation. 6- Cooperative learning by working collectively.
Inductive Contents	1. Introducing the student to the basics of the art of turning and milling, types of cold working machines, the skill of dealing with them, choosing metals, operational tools, and methods of measurement and standardization 2. Introducing the student to the basics of the art of casting, hot forming, metal selection, method of working on casting furnaces and tools, and manufacturing casting molds 3. Familiarize students with the basics of cars and the systems they use, as well as maintenance, disassembly, and assembly processes. 4. Introducing students to the basics of household and industrial electrical appliances, the skill of using tools, and designing electrical circuits and control panels 5. Introducing the student to the basics of the art of plumbing, leveling surfaces, the skill of using tools, manufacturing and installing geometric shapes, and methods of measurement and standardization 6. Introducing the student to the basics of the art of blacksmithing, cold and hot forming of metals, the method of hardening them, and the skills of dealing with hand tools, forming machines, and heating furnaces 7. Introducing the student to the basics of the art of filing and manual operation of metals with the help of manual, electrical, and mechanical tools, the skills of dealing with them, and the methods of measurement and standardization 8. Introducing the student to the basics of the art of welding, the

	installation and assembly of metals, the types of welding machines, the skills of dealing with them, the types of welding, and the methods of measurement and standardization 9. Introducing the student to the basics of the art of carpentry and woodworking with the help of manual, electrical, and mechanical tools, the skills of dealing with them, and methods of measurement and standardization

Student Workload (SWL)			
Structured SWL (h/sem)	93	Structured SWL (h/w)	6.00
Unstructured SWL (h/sem)	7	Unstructured SWL (h/w)	0.46
Total SWL (h/sem)	100		
Structured SWL (h/year)	186	Structured SWL (h/w)	6.00
Unstructured SWL (h/year)	14	Unstructured SWL (h/w)	0.46
Total SWL (h/year)	200		

Module Evaluation					
		Time/No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes				
	Assignments				All
	Projects / Practice	Every 3 weeks	60%	Continuous	
	Report				
Summative Assessment	Midterm Exam				
	Exam	Every 3 weeks	40%	Continuous	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)	
	Materials Covered
Week 1	Welding workshop. -Occupational safety and its importance in welding workshops. -Introduction to the basics of welding. -Electric arc exercise. -An exercise for welding straight lines in a circular motion (helical).
Week 2	Welding workshop - An exercise for welding straight lines with a crescent movement and other welding methods -Construction welding exercise.
Week 3	Welding workshop. -Welding two pieces together. -Written exam in practical exercises. -
Week 4	Casting workshop -Occupational safety and its importance in plumbing workshops. -Introduction to the basics of metal casting. -Simple wooden disc exercise. Half workout.
Week 5	Casting workshop Wheel exercise. Pushing arm exercise.
Week 6	Casting workshop. -Complete pulley exercise. -Circular pole exercise. -Written exam in practical exercises.
Week 7	Blacksmith Workshop -Occupational safety and its importance in blacksmithing workshops. -Introduction to the Basics of Blacksmithing. - Barbell adjustment exercise. -Eight-star exercise. - Exercise forming the number eight in English. -Six formation exercises in English.
Week 8	Blacksmith Workshop -An exercise forming the number five in English. - Exercise forming the number nine in English. . -An exercise in forming an iron model in the form of a circle
Week 9	Blacksmith Workshop - S-shape exercise. - Air hammer hot barbell exercise. - Exercise to form a circle on an electric bending machine. - Exercising cold and hot ornament formation. . - A written exam in practical exercises

Week 10	Automotive Workshop -Occupational safety and its importance in car maintenance workshops. -An introduction to cars and their basic parts. -Parts of the engine, how it works, types of engines, and methods of classification.
Week 11	Automotive Workshop - Open the engine and identify the parts -Lubrication system -Cooling system.
Week 12	Automotive Workshop -The fuel system. -The old and new ignition circuits. -Written exam in practical exercises.
Week 13	Turning Workshop -Introduction to lathe machines and identifying their parts -Measuring tools and the use of an oven measuring instrument -Circular column lathing exercise on different diameters.
Week 14	Turning Workshop -Exercise using the pen (semicircular R) brackets. An exercise in making different angles using a pen (square + angle pen 55).
Week 15	Turning Workshop - Making shaft with different diameter exercises using (left and right pen) - Workout (Tube Connection). -Written exam in practical exercises.
Week 16	Fitting workshop Occupational safety and its importance in filing workshops -An introduction to the basics of filing -Pen holder exercise “preparation and preparation”
Week 17	Fitting workshop Pencil holder exercises finishing and assembling.
Week 18	Fitting workshop -The catcher exercise. - Clamping exercise. Written exam in practical exercises.
Week 19	Carpentry workshop -Occupational safety and its importance in carpentry workshops. - An introduction to carpentry, its types, types of wood, tools used, and preparation Preparing the tools used Face modification exercise using the reindeer
Week 20	Carpentry workshop Garden fence work and how to connect its parts, the eight-star exercise
Week 21	Carpentry workshop - Wood smoothing exercise using smoothing paper

	- Wood dyeing exercise in three stages Final smoothing and varnishing exercise Written exam in practical exercises
Week 22	The tinsmith workshop Occupational safety and its importance in plumbing workshops An introduction to plumbing, its tools, and plumbing stages Planning and marking exercise on metal plates
Week 23	The tinsmith workshop Geometric shapes Types of individuals and methods of individuals Geometric shape individuals exercise on a metal board
Week 24	The tinsmith workshop Cone members exercise - Exercise of cylinders with an oblique cut Roll forming operations Connection without the use of an intermediary Written exam in practical exercises
Week 25	Electric Workshop Occupational Safety and its importance in electrical workshops An introduction to the basics of electrical installations - Linking a simple circuit consisting of a lamp to the control of a single-way switch. Connect two lamps in series with one-way switch control. Connecting two lamps in parallel with the control of a single road switch. Connect two lights with one-way dual switch control.
Week 26	electric Workshop Connect a fluorescent lamp circuit to a one-way switch control Connecting an electric supply socket circuit to the control of a separate or combined one-way switch Written exam in practical exercises
Week 27	electric Workshop Occupational Safety and its importance in blacksmithing workshops Introduction to the basics of Blacksmithing - Barbell adjustment exercise Eight-star exercise - Exercise forming the number eight in English Exercise forming the number six in English
Week 28	supplementary training curriculum Welding workshop Plumbing workshop Blacksmith's workshop
Week 29	supplementary training curriculum

	- Automotive workshop - Turning workshop Fitting workshop
Week 30	supplementary training curriculum Carpentry workshop The plumbing workshop electric Workshop

Learning and Teaching Resources		
	Text	Available in the library
Required Texts	Workshop technology and measurements, Ahmed Salem Al-Sabbagh,	yes
Recommended Texts		
Websites		

Module Information
معلومات المادة الدراسية

Module Title	Human Rights and Democracy	**Module Delivery**	
Module Type	**Support**	☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	HURD126		
ECTS Credits	**2**		
SWL (hr/sem)	**50**		

Module Level	UGI	**Semester of Delivery**	2
Administering Department	PE	**College**	OGE
Module Leader	D.Hadeel fawzi jasim	**e-mail**	10532@uotechnology.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	
Module Tutor	NA	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	Human rights are the social standards and moral principles that must be available to all human beings. These rights cannot be violated. They are due and inherent to every person simply because they are human. They give all human beings value and dignity, and their basis is justice, freedom and peace. Full knowledge of their contents, borders and ways of guaranteeing them, as the provision for the inclusion of rights in the core of international and national constitutions and covenants does not achieve practical benefit unless effective guarantees are available against the violations they are exposed to over time As for Democracy is the rule of the people by the people and for the people

	without prejudice to the rights of states, nations and peoples by choosing the mechanisms and forms that suit them. As for its forms and expressions, they are subject to the specificities of nations and peoples and the special circumstances of societies. The essence of democracy is the rule of the people by the people for the benefit of the people, which includes fixed features and elements, the most important of which are: respect for man as an end, not a means, participation in governance by the people, and achieving the satisfaction of the governed.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	An ability to skillfully communicate orally with gathering of people and in writing with various managerial leavels An ability to work adequately on teams and to set up objectives , plan activities ,meet due dates and manage risk and uncertainty
Indicative Contents المحتويات الإرشادية	Developing the student's analytical and critical skills regarding the reality and future of human rights and democracy Enabling students to understand the importance of education and its role in spreading the culture of human rights and democracy in building a civilized society based on good governance, the most important of which is belief in human rights and education on them and active participation in governance through free and fair elections.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	A- Spreading the culture of human rights and informing university students about it. B - The student's awareness of his civil, political, economic, social, cultural and environmental rights and the importance of preserving them and not waiving them. c- Raising awareness and educating university students about the importance of democracy, its methods and how to practice it, and thus contribute to establishing the rule of law, which adopts democracy as a basis for building it. d- The need for the student to realize that the real bet on achieving the democratic system in the country is how to root the concept of democracy and its principles and apply them effectively and successfully away from copying and quoting from others.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	45	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	2	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #4 and 7
	Assignments	2	10% (10)	2, 12	LO # 4 and 7
	Recording the student's attendance		10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 4 and 7
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 4-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	The human rights means and its properties and sections and The human rights in the old nations
Week 2	Human rights in the monotheistic religions / Islamic, Jewish and Christian religions
Week 3	Sources of human rights at the international and national levels
Week 4	Human rights guarantees at the internal and external levels
Week 5	Guarantees of human rights at the Islamic level
Week 6	The human rights future/The technology developmation and its effect on the rights and the freedoms/ The role of regional human rights organizations in protecting rights
Week 7	The child rights in Islam/The woman rights in Islam /Non-overnmental organizations and their role in the defense of human rights/Intellectual human rights/Fight Human Trafficking
Week 8	The concept of democracy and its roots / Definition of democracy
Week 9	The democracy between global and the privat
Week 10	forms of democracy/The direct democracy/The semi-direct democracy/The Parliamentary democracy
Week 11	The Parliamentary democracy The Parliamentary democracybasics and its faces
Week 12	Parliament and its internal organization
Week 13	The election Concept/constituency/Electoral lists/Election campaign vote
Week 14	election system Direct and indirect selection/ Individual selection and list/Majority system and proportional representation/interests representation system/Optional voting system and secret and compulsory voting
Week 15	**Preparatory week before the final Exam**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	The human and the child rights and the democracy ((DR . Maher saleeh alaawi)) Iraq republic , minstery of the higher education and the scientific research 2009 -Also same references from the internet	
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information معلومات المادة الدراسية					
Module Title	Statistical and Optimization			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	STOP216				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UGII	**Semester of Delivery**		1
Administering Department		PE	**College**	OGE	
Module Leader	Asst.lect. Ali Khaleel Faraj		**e-mail**	150103@uotechnology.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	2		**e-mail**	E-mail	
Peer Reviewer Name		Dr. Fadhil S. Kadhim	**e-mail**	150010@uotechnology.edu.iq	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CALC123	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Foundation material in probability and statistical inference. Topics include sample spaces, conditional probability, random variables, discrete and continuous probability

	distributions, expectation, estimation, and hypothesis testing as well as Simple linear regression, model and equation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Learn the language and core concepts of probability theory. 2- Use software and simulation to do statistics. 3- Become an informed consumer of statistical information.
Indicative Contents المحتويات الإرشادية	1- Dealing with numbers and variables and identifying the methods of dealing with them. Studying Central tendency measures as important tools in dealing with many variables Define the Probability theories and determine how to deal with all variables according to the correct method of probability, and using suitable methods to deal with methods of continuous and discrete variables. 2- Using suitable software to deal with the large number of variables of all kinds. Recognition through exercise to determine the quality of variables and calculate central tendency measures and measures of variation. 3- Finding the relationship between dependent and independent variables and construct the correlation coefficient and degree of correlation as well as the studying the regression models and determining the equation. learning how to draw the relationship of the different variables.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	As a basic strategy .. students try through this course to identify the correct statistical methods in dealing with the numbers and the multi variables that they might deal with regarding of oil and gas engineering applications, in addition to studying the systems, concepts and theories of probability through which it can infer accurate facts and information which will be highly beneficial in their field and its practical applications through the use of a set of specialized software.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem)	47	**Unstructured SWL (h/w)**	3

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	1	10% (10)	1-4	1
	Assignments	1	10% (10)	5-8	1,2
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	1,2,3
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8	1,2,3
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction and Fundamental elements of statistics.
Week 2	Types of data, Methods of describing data.
Week 3	Measures of central tendency.
Week 4	Measures of variation.
Week 5	Probability and Discreet of random variable.
Week 6	Probability and Continuous random distribution.
Week 7	Normal Distribution.
Week 8	Applications .
Week 9	Testing of Hypothesis.
Week 10	Traditional Methods.
Week 11	z Test for a Mean and Chi-square
Week 12	Simple linear regression.
Week 13	The coefficient of correlation.

Week 14	Regression model.
Week 15	Regression equation.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Allan G. Bluman, 2007. Elementary Statistics: step by step approaches , Mc. Graw Hill, 7th edition.	Not sure
Recommended Texts	-	
Websites	-	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information
معلومات المادة الدراسية

Module Title	Structure geology	**Module Delivery**	
Module Type	**Basic**		☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒**Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	STGE215		
ECTS Credits	**4**		
SWL (hr/sem)	**100**		

Module Level	UGII	**Semester of Delivery**	1
Administering Department	PE	**College**	OGE
Module Leader	Dr. Mayssaa Ali Al-Bidry	**e-mail**	mayssaa.a.abdwon @uotechnology.edu.iq
Module Leader's Acad. Title	Asst. Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	1	**e-mail**	Mayssaa.a.abdwon@uotechnology.edu.iq
Peer Reviewer Name	Dr. Fadhil S. Kadhim	**e-mail**	150010@uotechnology.edu.iq
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	GEGE122	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	Explain basic concepts related to structural geology Study the relationship between structure geology and petroleum engineering
Module Learning Outcomes	* An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics. * An ability to develop the confidence necessary to successfully solve Mathematical

مخرجات التعلم للمادة الدراسية	problems. * An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
Indicative Contents المحتويات الإرشادية	The outcomes of this course are used to study the stress and ductile deformation, thus understand rock mechanic and relation with petroleum engineering. Also, study the concepts of folds and fractures, thus understand hydrocarbon migration and traps. A successful petroleum engineers needs a broad background, and a willingness to learn and apply a wide range of information and techniques to the problems of finding, developing, and exploiting a petroleum reservoir.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	1- Explain fundamental concepts relevant to structure geology 2- Explain the concepts of stress and brittle deformation 3- Explain the concepts of stress and ductile deformation 4- Explain the fault connectivity during hydrocarbon migration 5- Explain naturally fractured Reservoirs 6- Explain the concepts of folds and hydrocarbon traps

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

	Time/Nu	Weight (Marks)	Week Due	Relevant Learning

		mber			Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Stress in rocks: Introduction, Traction, Stress components.
Week 2	Stress in two dimensions, Biaxial stress, Uniaxial stress, Pure shear stress, Stress in three dimensions
Week 3	Deformation and strain, homogeneous strain and the strain ellipsoid, strain path, Coaxial and non-coaxial strain accumulation, superimposed strain,
Week 4	Strain quantities: Longitudinal Strain, Volumetric Strain, Angular Strain, Other Strain Quantities
Week 5	Faults: introduction, Fault components/Terminologies, the attitude of fault, classification of fault, Dip Slip Faults, Listric Normal Fault, Strike slip fault, Transfer fault, Tear Fault, Transform fault, Scissors fault
Week 6	Principal stress orientation for three main fault types: Normal Fault systems (Horst and graben and Half-Graben Blocks), Geometric classification of fault, Classification based on rake of net slip, Classification Based on attitude of fault relative to altitude of adjacent beds, Classification Based on fault pattern, Classification Based on angle at which fault dips, Fault activity
Week 7	Geological factors in characterizing fault connectivity during hydrocarbon migration, Parameters characterizing fault connectivity, Parameterization of geological factors controlling fault connectivity, case study (Effectiveness of selected parameters in assessing fault connectivity), Fault traps
Week 8	Joints: introduction, Joint patterns, Master joints, Plumose Structure, Twist hackle, Systematic and Non-systematic Joints, Joint Sets and Joint Systems, Cross-Cutting Relations between Joints, Joint

	Spacing in Sedimentary Rocks,
Week 9	Origin and interpretation of joints (Joints Related to Uplift and Unroofing, Formation of Sheeting Joints, Natural Hydraulic Fracturing, Stylolite joints), Mechanics of jointing
Week 10	The Nature of Naturally Fractured Reservoirs, Open and healed fractures, naturally fractured reservoirs classification, Fractured Rocks Properties (porosity, permeability, Compressibility)
Week 11	Fold: introduction, Folding processes, Mechanical role of layers: Active / passive folding, Folding mechanisms (Bending, Lithospheric-scale flexures, Buckling (Single layer buckling, Multilayer buckling, Influence of spacing) Flexural Folding. Flowage Folding, Shear Folding, Folding Due to intrusions, Folding Due to Differential Compression,
Week 12	Fold types, Geometric of folded surface, classification of fold based on Shape and orientation, Classification of folds relative to hinge curvature is referred to as bluntness, Classification based on the orientation of the hinge line and the axial plane, Fold axis orientation, Classification based on Interlimb angles, Fold Symmetry
Week 13	Fold dimensions (draw and calculations), Orientation of a plane (dip and strike), Draw and calculations thickness and depth of beds
Week 14	Dom, hydrocarbon traps
Week 15	Structural basin geology
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Structural maps
Week 2	Calculation the thickness of layers from maps
Week 3	Calculation the thickness of layers (case one)
Week 4	Calculation the thickness of layers (case two)
Week 5	Calculation the thickness of layers (case three)

Week 6	Calculation the depth of layers (case one , two)
Week 7	Calculation the depth of layers (case three)

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Natural Fractured Reservoir Engineering The Nature of Naturally Fractured Reservoirs	No
Recommended Texts	Structure geology	No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information
معلومات المادة الدراسية

Module Title	Academic English Writing	**Module Delivery**	
Module Type	**Support or related learning activity**		☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	ACEW211		
ECTS Credits	**4**		
SWL (hr/sem)	**100**		

Module Level	UGII	**Semester of Delivery**	1
Administering Department	PE	**College**	OGE
Module Leader	Prof. Dr. Najem Al-Rubaiey	**e-mail**	100108@uotechnology.edu.iq
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	NA	**e-mail**	E-mail
Peer Reviewer Name	Prof. Dr. Fadhil S. Kadhim	**e-mail**	150010@uotechnology.edu.iq
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	ENLA111	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	Aims and objectives are: 1. to offer a structure approach to writing 2. to acquaint the students with the process of writing 3. to provide practice in basic sentence structure 4. to develop Grammar and Mechanics skills
Module Learning	1. Be able to express themselves in correct English with correct grammar usage

Outcomes مخرجات التعلم للمادة الدراسية	2. Be able to construct coherent and logically constructed paragraphs 3. Write a sentence that expresses an idea in short (topic sentence) 4. Recognize the various types of supporting evidence to support their topic sentence 5. Limit ideas according to the context
Indicative Contents المحتويات الإرشادية	This course concentrates on the paragraph as the basic unit in extended writing. It begins with a review of sentence types, then it takes the students through the way of paragraph development including a topic sentence, supporting evidence and a concluding sentence. This course aims at developing students' writing and guiding students through the logical steps necessary for creating a paragraph.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The methods of instruction may include, but are not limited to: 1. Lectures 2. Individual assignments 3. Listening 4. Any active learning method such as: small group, presentations

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome

Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 5
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-3
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction
Week 2	Paragraph Structure
Week 3	Parts of a paragraph
Week 4	Topic Sentence
Week 5	Exercises on topic sentences
Week 6	Supporting sentences
Week 7	Concluding Sentence
Week 8	Midterm exam
Week 9	Achieving coherence by repetition of key nouns
Week 10	Achieving coherence by Using consistent Pronouns
Week 11	Achieving coherence by using Transition words
Week 12	Achieving coherence by arranging ideas in logical order
Week 13	Supporting Details
Week 14	Facts vs. Opinions

Week 15	Plagiarism
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	English for Oil and Gas #2 (Oxford English for Careers: Oil and Gas, Lewis Lansford, D'Arcy Vallance, Jon Naunton, and Alison Pohl. Oxford University Press.).	Yes
Recommended Texts	Academic Writing from paragraph to essay, Lisa A. Rumisek, Dorothy Zemach. Macmillan, Oxford, 2005	No
Websites	A Practical Guide to Academic Writing for International Students: https://www.routledge.com/rsc/downloads/A_Practical_Guide_to_Academic_Writing_for_International_Students-A_Routledge_FreeBook-_FINAL_VERSION_.pdf	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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Module Information
معلومات المادة الدراسية

Module Title	Computer Programming II	**Module Delivery**	
Module Type	**Support or related learning activity**		☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	COPR214		
ECTS Credits	5		
SWL (hr/sem)	125		

Module Level	UGII	**Semester of Delivery**	1
Administering Department	PE	**College**	OGE
Module Leader	**Salam A. Thajeel**	**e-mail**	E-mail: **salam.a.thajil@uotechnology.edu.iq**
Module Leader's Acad. Title	Asst. Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	1	**e-mail**	E-mail
Peer Reviewer Name	Dr. Fadhil S. Kadhim	**e-mail**	150010@uotechnology.edu.iq
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	COPR115	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The main objective of this course is to provide a foundation in programming for engineering problem solving using the MATLAB software package. Students will develop the skills analyze and break down an engineering program and solve it algorithmically using MATLAB. After this course, students will have an understanding of various programming constructs and how they can be used to solve a computational problem.
Module Learning	• An ability to identify, formulate, and solve engineering problems by

Outcomes مخرجات التعلم للمادة الدراسية	applying principles of engineering, science, and mathematics. • An ability to develop the confidence necessary to successfully solve Mathematical problems with a computer. • An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
Indicative Contents المحتويات الإرشادية	we will provide students with the skills to create & develop applications using MATLAB , where that allow Engineers to develop engineering applications that run in the Windows environment. MATLAB provides the engineer a programming tool to write simple programs quickly that meet their needs. Example programs written using MATLAB include gas and oil fluid correlations, interpolation software, gas well bottom hole pressure from surface conditions, volumetric reserve calculations, simple log analysis, water pattern analysis and bottom hole pressure analysis, also MATLAB can help you develop predictive maintenance algorithms customized to the specific operational and architectural profile of your equipment. Use Predictive Maintenance Toolbox to design condition indicators and estimate the remaining useful life of your critical equipment like pumps and compressors

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to Encourage students to ask and answer questions, as well as training students to implement many practical exercises in the laboratory (which covers most of what is studied in theoretical lectures), which in turn gives students the ability to carry out the work required of them in the future in their practical life.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Starting With Matlab: MATLAB windows , Menus and the toolbar , Working in the command window , Arithmetic operations with scalars , Display formats , Elementary math built-in functions, Useful commands for managing variables, Script files and the Editor Debugger, Matlab Help System
Week 2	Vector :Row Vectors, Extracting Bits of a vector, Column Vectors, Transposing, Matrices.vector addressing , Using a colon:in addressing vector , Adding elements to existing variables, Deleting elements, Built-in functions for handling vector , Mathematics With vector: Addition and subtraction , vector multiplication, vector division ,
Week 3	Creating Arrays: Creating a two-dimensional array (matrix) , The transpose operator , Array addressing , Using a colon: in addressing arrays, Adding elements to existing variables, Deleting elements, Built-in functions for handling arrays
Week 4	Mathematics With Array:Addition and subtraction , Array multiplication, Array division ,

	Elementby-element operations , Using arrays in MATLAB built-in math functions,Built-in functions for analyzing arrays, Generation of random numbers
Week 5	Functions:Elementary Functions(log10, log, exp, sqrt), Max, min, mean, all, sort, unique, length, size, sum, abs functions, Polyarea, std (Standard Deviation), roots (Polynomial Roots), polyval, diff functions, Build functions
Week 6	Programming In Matlab: Relational and logical operators, Conditional statements, if constructs(if ... end, if ... else ... end, if ... elseif ... else ... end), Switch statements. The switch case statement,
Week 7	Loops:For Loops, while loop, Break & continue statement.
Week 8	Symbolic toolbox Factor, simplify and Expand the terms, Solving Equations, User-definedfunction (Inline, vectorize), Differentiation(The first derivative, The nth derivative), Integration (Definitive and in-definitive integrals, Multiple integral), Solutions of Differential Equations (First Order Differential Equations, Higher Order Differential Equations), Limits
Week 9	Graphic Plotting functions, Plotting a given data set, Adding (titles, axis labels, and annotations), Multiple data sets in one plot, Multiple Plots in One Figure, Three Dimensional Plot-Surface Generation
Week 10	Polynomials, Curve Fitting, And Interpolation : Polynomials, Curve fitting , Interpolation , Extrapolation
Week 11	Applications and Engineering Problems:Numerical analysis,The Root of The Equation Iteration method, Linear interpolation method, Bisection method, Tangent method (Newton-Raphson method).
Week 12	Solution of System of Equations: The Elimination method, Gauss-Jordan method, Gauss- Seidel Method, Newton-Raphson method.
Week 13	The solution of Ordinary Differential Equations: The Taylor Series method, The Euler method, The Runge-Kutta method, Method of Solving Higher Order Equations
Week 14	Petroleum Data Science and Machine Learning
Week 15	Apply the fundamental knowledge of mathematics, science & engineering, to solve the real

	engineering problems
Week 16	**Preparatory week before the final Exam**
Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Starting With MATLAB: MATLAB windows , Menus and the toolbar , Working in the command window , Arithmetic operations (exercises using MATLAB as calculator).
Week 2	Vectors (practical exercises + homework): Row Vectors, Column Vectors, Transposing, Vector addressing , Adding elements to existing variables, Deleting elements, Built-in functions for handling vector , Mathematics With vector: Addition and subtraction , vector multiplication, vector division .
Week 3	Matrices (practical exercises + homework): Creating a two-dimensional array (matrix) , The transpose operator , addressing , Using a colon: in addressing arrays, Adding elements to existing variables, Deleting elements.
Week 4	Mathematics with Matrix (practical exercises + homework): Addition and subtraction, Array multiplication, Array division, element by-element operations.
Week 5	Built in functions (practical exercises + homework): log10, log, exp, sqrt, max, min, mean, all, sort, length, size, sum, abs, polyarea, std (Standard Deviation).
Week 6	Test.
Week 7	Programming In Matlab (practical exercises + homework): Relational and logical operators. Solving simple exercises using script files (Editor).
Week8	Conditional statements (practical exercises + homework): if constructs (if ... end, if ... else ... end, if ... elseif ... else ... end), Switch statement (The switch case statement).
Week9	Loop statements (practical exercises + homework): For Loops, while loop, Break & continue statement.
Week10	User defined functions (practical exercises + homework): Creating a function file, structure of a function file, saving a function file , and using a user-defined function
Week11	Graphic (practical exercises + homework): Plotting functions, Plotting a given data set, Adding (titles, axis labels, and annotations), and

	multiple data sets in one plot, Multiple Plots in One Figure, Three Dimensional Plot-Surface Generation
Week12	Symbolic toolbox (practical exercises + homework): Factor, simplify and Expand the terms, Solving Equations, User-defined function (Inline, vectorize), Differentiation, Integration, Solutions of Differential Equations (First Order Differential Equations, Higher Order Differential Equations), and Limits.
Week13	Solution of System of Equations (practical exercises + homework): The Elimination method, and Newton-Raphson method.
Week14	Solve some engineering problems using MATLAB
Week15	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. RudraPratap: Getting started with MATLAB 7, Oxford Press (Indian edition),2006. 2. Desmond J. Higham and Nicolas J. Higham: Matlab Guide, SIAM, 2000.	yes
Recommended Texts	Introduction to MATLAB for Chemical & Petroleum Engineering 2nd Edition by Sam Toan , Hertanto Adidharma , Bahareh Nojabaei	No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors

	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group **(0 – 49)**	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information

معلومات المادة الدراسية

Module Title	Fluid Mechanic I	**Module Delivery**	
Module Type	**Basic**		☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	**FLME213**		
ECTS Credits	**5**		
SWL (hr/sem)	**125**		

Module Level	UGII	**Semester of Delivery**	1
Administering Department	PE	**College**	OGE
Module Leader	Dr. Anwar N. Mohammed Ali	**e-mail**	10605@uotechnology.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	1	**e-mail**	10605@uotechnology.edu.iq
Peer Reviewer Name	Dr. Fadhil S. Kadhim	**e-mail**	150010@uotechnology.edu.iq
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	CALC123	**Semester**	2

Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This course provides students an information on the principal concepts and methods of fluid mechanics. Topics covered in the course include pressure, hydrostatics, control volume analysis; mass conservation, momentum conservation and energy conservation for moving fluids; viscous fluid flows, flow through pipes; dimensional analysis; boundary layers. Students will work to formulate the models necessary to study, analyze, and design fluid systems through the application of these concepts, and to develop the problem-solving skills essential to good engineering practice of fluid mechanics in practical applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- To give the student the knowledge in fluid types, physical properties and the consequence of such properties on fluid flow, and types of units and their conversion. 2- To make the students release the forces acting on static fluid. 3- To give knowledge on types of flow and the basic forces acting on simple profiles and shapes in an steady fluid flow. 4- To give knowledge on viscous flow ,friction factor and losses in pipes.
Indicative Contents المحتويات الإرشادية	Students will work to formulate the models necessary to study, analyze, and design fluid systems through the application of these concepts, and to develop the problem-solving skills essential to good engineering practice of fluid mechanics in practical applications.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Using the following: 1- Discussion. 2- Brain storming by encouraging students to produce a large number of ideas about some issue or problem raised during the lecture. 3- Self-learning by teaching the student by his own according to his special abilities and mental and cognitive levels responding to his preferences and interests to

	achieve development and integration of his capabilities. 4- Cooperative learning by team working.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 12	LO #1 and 4
	Assignments	2	10% (10)	2, 10	LO # 1, 3 and 4
	Projects /	-	-	-	-
	Report	1	10% (10)	13	LO # 1 and 3
Summative assessment	**Midterm Exam**	2 hr	20% (20)	7	LO # 1,3 and 4
	Final Exam	2hr	50% (50)	16	LO # 1,3 and 4
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered

Week 1	**Introduction** Syllabus and References Definition, types of fluids, units and dimensions
Week 2	**Physical Properties** dynamic and kinematic viscosity, surface tension, vapor pressure and cavitation.
Week 3	**Static Fluid** static fluid and gage measurement.
Week 4	**Static Fluid** Application on pressure gage measurement.
Week 5	**Hydrostatic Forces on Submerged Surfaces** Hydrostatic Forces on Plane Surfaces, and curved Surfaces .
Week 6	**Hydrostatic Forces on Submerged Surfaces** Buoyancy
Week 7	**Dynamic Fluid** Definition, Reynolds no. ,types of flow and flow pattern . flow in noncircular duct, and the derivation.
Week 8	**Governing Equations** Continuity equation, momentum equation, and energy equation.
Week 9	**Governing Equations** Euler equation, Bernoulli equation and its modification
Week 10	EGL and HGL.
Week 11	**Velocity Distribution** Derivation of velocity distribution, maximum, average and mean velocity for laminar flow
Week 12	**Velocity Distribution** Velocity distribution, maximum, average and mean velocity for turbulent flow.

	Correction factor
Week 13	**Friction in Pipes** Types of friction, skin friction and derivation of Darcy equation, form friction and its application.
Week 14	**Losses in Pipes** Major and minor losses.
Week 15	**Preparatory week before the final Exam**
Week 16	**Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Streeter, V. "Fluid Mechanic", 6th edition, Mc-Graw Hill, 1975 . • Frank M. White "Fluid Mechanics", 5th edition, McGraw Hill. 1997. • Coulson & Richardson's Chemical Engineering - Vol. 1, Fluid Flow, Heat Transfer and Mass Transfer - 6th edition, Butterworth-Heinemann, 1999. • R. C. Hibbeler "FLUID MECHANICS", 2nd edition in SI units, Pearson Education, 2021.	
Recommended Texts	Frank M. White "Fluid Mechanics", 5th edition, McGraw Hill. 1997.	
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information

معلومات المادة الدراسية

Module Title	Ordinary differential equations	**Module Delivery**	
Module Type	**Basic**		☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	OPDE212		
ECTS Credits	**5**		
SWL (hr/sem)	**125**		

Module Level	UGII	**Semester of Delivery**	1
Administering Department	PE	**College**	OGE
Module Leader	Muayad M. Hasan	**e-mail**	E-mail
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	2	**e-mail**	E-mail
Peer Reviewer Name	Dr. Fadhil S. Kadhim	**e-mail**	150010@uotechnology.edu.iq
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	CALC123	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Important objectives of the calculus sequence are to develop and strengthen students' problem-solving skills and to teach them to read, write, speak, and think in the language of mathematics. In particular, students learn how to apply calculus tools to a variety of problem situations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Find limits of functions (graphically, numerically, and algebraically) 2. Analyze and apply the notions of continuity and differentiability to algebraic and transcendental functions. 3. Determine derivatives by a variety of techniques including explicit differentiation, implicit differentiation, and logarithmic differentiation. Use these derivatives to study the characteristics of curves. Determine derivatives using implicit differentiation and use them to study the characteristics of a curve. 4. Students will use a variety of methods to solve the Laplace and Poisson equations. 5. Harmonic function characteristics will be examined by the students. 6. The heat and wave equations will be solved, and students will examine their characteristics. 7. The characteristic approach will be used by students to resolve first order partial differential equations. 8. Students will evaluate conservation laws' characteristics. 9. Students will examine some other nonlinear PDEs' properties if time allows.
Indicative Contents المحتويات الإرشادية	1. To model and comprehend scenarios involving exponential growth or decay and second order physical systems, use established DE types. 2. Use a variety of input functions, such as zero, constants, exponentials, sinusoids, step functions, impulses, and superpositions of these functions, to solve the major equations.

	3. Use the characteristic equation, exponential response formula, Laplace transform, convolution integrals, Fourier series, complex arithmetic, parameter variation, elimination, and anti-elimination methods to solve the differential equations mentioned above. 4. Be able to solve linear DEs using the fundamental ideas of linearity, superposition, and the existence and uniqueness of DE solutions.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	• Highlight conceptual comprehension. • Assign homework that is difficult and builds on the lessons you gained in class. • Cooperative learning strategies ought to be applied. • Submit intelligent queries. • Put your focus on logical reasoning and practical problem-solving. • Use a range of assessment techniques.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome

Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	- Review of basics of differentiation and integrations
Week 2	- Basic concepts of ordinary differential equation
Week 3	- Methods of solving First order differential equations I
Week 4	- Methods of solving First order differential equations II
Week 5	- Applications of First order differential equations I
Week 6	- Applications of First order differential equations II
Week 7	- Methods of solving Higher order ordinary differential equation I
Week 8	- Methods of solving Higher order ordinary differential equation II
Week 9	- Applications of Higher order differential equations I
Week 10	- Applications of Higher order differential equations II
Week 11	- Series solution of differential equations
Week 12	- Power series
Week 13	- Taylor series
Week 14	- Frobenius series

Week 15	- Final Exam
Week 16	- **The preparatory week before the Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- George B. Thomas, "THOMAS' CALCULUS ", Eleventh Edition 2011, Dorling Kindersley (India). 2- Spiegel, M. R. Schaums outline series, theory and problems of Lablace transform, copy write 1965 by Mc Graw-Hill Inc. 3- Spiegel, M. R. Schaums outline series, theory and problems of Fourier analysis with application to boundary value problem, copy write 1974 by Mc Graw-Hill Inc.	
Recommended Texts	1- Ford , S.R. and Ford , J.R. " Calculus " , (1963) McGraw-Hill. 2- K.Back house and S.P.T. Houldsworth " Pure Mathematics a First Course " (1979) , S1 Edition , Longman Group . 3- Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons. Inc., 9th ed., 2006.	
Websites	1- https://en.wikipedia.org/wiki/Differential_equation 2- https://byjus.com/maths/differential-equation/	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group	**A -** Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	**B -** Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information
معلومات المادة الدراسية

Module Title	Petroleum Geology	**Module Delivery**	
Module Type	**Core**		☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	PEGE221		
ECTS Credits	**4**		
SWL (hr/sem)	**100**		

Module Level	UGII	**Semester of Delivery**	2
Administering Department	PE	**College**	OGE
Module Leader	Dr. Ahmd A. Ramdhan	**e-mail**	150073@uotechnology.edu.iq
Module Leader's Acad. Title	Assist. Prof.	**Module Leader's Qualification**	PhD
Module Tutor	NA	**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	STGE215	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Understanding the nature of the organic-rich source rock, the paleoaquifers in which the petroleum flowed, and the trapping mechanism are important parts of Petroleum Geology. A petroleum engineers needs to have a broad knowledge of sedimentary geology (sedimentology and petrography), stratigraphy, structural geology, and hydrogeology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	* An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics. * An ability to develop the confidence necessary to successfully solve Mathematical problems with a computer. * An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
Indicative Contents المحتويات الإرشادية	The outcomes of this course are used to construct the evolutionary histories of sedimentary basins. Thus, a successful petroleum engineers needs a broad background, and a willingness to learn and apply a wide range of information and techniques to the problems of finding, developing, and exploiting a petroleum reservoir.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Have a basic understanding of the petroleum system, petroleum as a resource, and the value chain. 2. Have a basic understanding of petroleum formation and origin. 3. Understand how geologists conduct the search for petroleum resources through the value chain or the life cycle of a petroleum resource. This will include the processes involved and actual examples. 4. Learn details on how to begin evaluating a hydrocarbon play and

	developing a prospect. 5. Learn the concepts of migration and accumulation of hydrocarbon 6. Learn the principles of mapping a subsurface reservoir.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	60	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects /	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري	
	Material Covered
Week 1	INTRODUCTION What is petroleum geology?, Principal of petroleum geology, Why is Carbon so Important in the Life Cycle, Oil and Gas.
Week 2	ORIGIN OF PETROLEUM FORMS Characteristics of petroleum reservoirs, Exploration activities in a sedimentary basin.
Week 3	PETROLEUM TRAP 1 General Considerations, Structural Traps, Types of Structural traps, Stratigraphic Traps,
Week 4	PETROLEUM TRAP 2 Types of stratigraphic traps, Combination Traps, Hydrodynamic Traps
Week 5	ORIGIN, MIGRATION, AND ACCUMULATION 1 Origin of petroleum, Total Organic Carbon (TOC), Source Rocks, TOC Types,
Week 6	ORIGIN, MIGRATION, AND ACCUMULATION 2 Conversion of OM to HC, Dehydrogenization and Carbonization, Deoxygenization and Carbonization.
Week 7	SOURCE ROCK QUALITY Maturation, Purposes of maturation indicators, Lopatin's TTI Index, Other Maturation Indicators, Oil Source Rock Criteria.
Week 8	MIGRATION OF HYDROCARBON 1 General considerations, Formation water, Formation water composition, Pressure and temperature during burial,
Week 9	MIGRATION OF HYDROCARBON 2 Evidence for Migration, Primary Migration, Primary Migration Controversy, Primary Migration Mechanisms ,Secondary Migration, Migration Pathways
Week 10	PETROLEUM RESERVOIR CHARACTERISTIC
Week 11	EXPLORATION TECHNIQUES FOR HYDROCARBON Surface geology, Subsurface geology, Drilling operations
Week 12	MAPS AND CROSS SECTIONS Contour maps, Geologic maps, Cross sections
Week 13	PETROLEUM GEOLOGY OF IRAQ AND SURROUNDING REGIONS 1
Week 14	PETROLEUM GEOLOGY OF IRAQ AND SURROUNDING REGIONS 2

Week 15	**Preparatory week before the final Exam**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Basic Petroleum Geology, Peter K. Link	Yes
Recommended Texts	Elements of Petroleum Geology (2nd edition): Academic Press, Toronto,	No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information معلومات المادة الدراسية					
Module Title	Properties and transportation of crude oil and gas			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	PTCO222				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	UGII		**Semester of Delivery**	2	
Administering Department	PE		**College**	OGE	
Module Leader	Ramzy. S. Hamied		**e-mail**	E-mail	
Module Leader's Acad. Title	Ass. Prof. Dr		**Module Leader's Qualification**	PhD	
Module Tutor	NA		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	FLME213, CHEM121	**Semester**	1, 2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	**Providing students with science and knowledge in oil and gas different types of transportation as single-phase flow and two-phase flow, Stresses types, study the types of pumps, compressors, legislation and laws relating to the transfer and storage of oil and gas, methods of storage and calculations of economic diameter. Also study the characteristics of crude oil and its products in terms of classification and use Products and methods of obtaining them as well as disposal methods of unwanted compounds in crude oil or its various products (light, medium and heavy).**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1- To give the student the knowledge in pipeline, horizontal and non-horizontal flow calculation as single and two-phase flow.** **2- To give student the knowledge of sizing and specifying pipe, selection of route, protection against corrosion pipe lying. Types of oil and gas transportations.** **3- To give student the idea about tanks, pressure vessels, design and selection of storage tanks.** **4- To give the student the knowledge and experiments of Petroleum assay (carbon residue, asphaltene content) Density, distillation, Light hydrocarbon, salt content, Sulfur content, Viscosity and pour point.** **5- To give student the knowledge of Crude oil properties, Industrial process of distillation towers and fraction processes.** **6- To give student the idea liquid petroleum gases (LPG), gasoline blending components, and naphtha, jet fuel, kerosene, and distillates, and Lubricated oil, Residue Fuel Oil, Wax, Asphlitane.**
Indicative Contents	**This course focus to crude oil and gas properties first part then in the second part study oil and gas transportation which make the students through the**

المحتويات الإرشادية	**application of module learning outcomes concepts to develop the problem-solving skills essential to good engineering practice of practical applications of Properties and transportation of crude oil and gas.**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**1. Lectures.** **2- Discussion.** **3- Presentations and Listening.** **4- Encourage students to team working.** **5- Encouraging students to submit reports on problem and solutions related to the curriculum.**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية				
	Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**

Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects /	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Source of Oil and classifications, Petroleum assay (carbon residue , asphaltene content) Density, Viscosity, Distillation process, Light hydrocarbon, salt content.**
Week 2	**Sulfur content, pour point, Properties of Oil Stock, fractional Industries, Industrial process of distillation towers and fraction processes, Basic operation in petroleum processing.**
Week 3	**Light products and Their properties (Gasoline blending components, and naphtha, Liquid petroleum gases (LPG))**
Week 4	**Mid-range Oil Products (Jet fuel, kerosene)**
Week 5	**Heavy Oil products and Their Properties (Residue Fuel Oil, Wax (classification, types) , Lubricants)**
Week 6	**Methods of Oil and Gas Transportation (single flow calculations) and Pipeline Transportation of single and Multi-phase Flow**
Week 7	**Efficiency of Pipeline Transportation with other types**
Week 8	**Multi-phase Flow**
Week 9	**Horizontal and Non-Horizontal Flow Calculation multi-phase flow**
Week 10	**Gas Flow in Series, Parallel and Network Pipelines, Gathering pipelines. The SCADA**

	System for pipelines.
Week 11	**Pipelines Economics, Pipelines Design, Pipeline networks, Sampling and Testing of Oil and Gas.**
Week 12	**Pumps and Compressors, Instrumentation and Control, Safety and Supervision.**
Week 13	**Rules and Regulation in Transportation and Storage of Oil and Gas, Economic pipe diameter.**
Week 14	**Types of Storage, Underground Storage of Natural Gas**
Week 15	**Preparatory week before the final Exam**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**density and specific gravity**
Week 2	**Astm distillation**
Week 3	**flash and fire point**
Week 4	**carbon residue and Ash content**
Week 5	**sulfur content**
Week 6	**smoke point**
Week 7	**octane and cetane number**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**1- Emir Ceriþc, "Crude Oil , Processes and Products", ISBN (9958917343, 9789958917349). 2012.** **2- Vasily .S and Raphael. I, Marcel Dekker, "Crude Oil Chemistry", Inc, New York Basel 2005.** **3- James. G. Speight "Petroleum Chemistry and Refining", Applied Energy Technology Series, Taylor and Francis USA, 1998.** **4- "Oil and Gas Production Handbook", Havard Devold., Wikipedia (The Free Encyclopedia), 2013.** **5- "Gas Conditioning and Processing: The Basic Principles", John. M. C., Robert. A. H., Robert. N. M., Copyright Campbell Petroleum Series USA. 1992.** **6- "Production and Transportation of Oil and Gas B: Gathering and Transportation (Development in Petroleum Science)", A. P. Szilas, Elsevier Science Publishing Company 1986.**	
Recommended Texts	**1- Emir Ceriþc, "Crude Oil , Processes and Products", ISBN (9958917343, 9789958917349). 2012.** **2- "Oil and Gas Production Handbook", Havard Devold., Wikipedia (The Free Encyclopedia), 2013.**	
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**

Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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Module Information
معلومات المادة الدراسية

Module Title	Fluid Mechanic II		**Module Delivery**	
Module Type	**Basic**		☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	FLME223			
ECTS Credits	**6**			
SWL (hr/sem)	**150**			
Module Level	UGII		**Semester of Delivery**	2
Administering Department	PE		**College**	OGE
Module Leader	Dr. Anwar N. Mohammed Ali		**e-mail**	10605@uotechnology.edu.iq
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	PH.D.
Module Tutor	Dr. Anwar N. Mohammed Ali		**e-mail**	10605@uotechnology.edu.iq
Peer Reviewer Name	Name		**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	FLME213	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This course provides students an information on the principal concepts and methods of fluid mechanics. Topics covered in the course include pipe systems and pipes network, fluid measurements(types and their importance), Non Newtonian liquids, dimensional analysis, pumps, flow of compressible fluid, and flow in porous media. Students will work to formulate the models necessary to study, analyze, and design fluid systems through the application of these concepts, and to develop the problem-solving skills essential to good engineering practice of fluid mechanics in practical applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- To give the student the knowledge in types of fluid measurements; their importance, principles and applications. 2- To give the students an idea on Non-Newtonian fluids; their types and models, their physical principles of flow, and friction. 3- To give the students an idea on dimensional analysis grouping. 4- To give knowledge on types of pumps and their principles. 5- To make the students release the compressible fluid; their difference from incompressible fluid and how to write their basic equations
Indicative Contents المحتويات الإرشادية	Students will work to formulate the models necessary to study, analyze, and design fluid systems through the application of these concepts, and to develop the problem-solving skills essential to good engineering practice of fluid mechanics in practical applications.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Using the following: 1- Discussion.

	2- Brain storming by encouraging students to produce a large number of ideas about some issue or problem raised during the lecture. 3- Self-learning by teaching the student by his own according to his special abilities and mental and cognitive levels responding to his preferences and interests to achieve development and integration of his capabilities. 4- Cooperative learning by team working.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	90	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 13	LO #1
	Assignments	2	10% (10)	3, 11	LO # 1 and 4
	Projects / lab	1	10% (10)	15	LO # 1 and 3
	Report	7	10% (10)	2,4,6,8,10,12,14	LO # 1,3 and 4
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1 and 3
	Final Exam	2hr	50% (50)	16	LO # 1 and 3

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Multiple-pipe system** Parallel connection, series connection.
Week 2	**Multiple-pipe system** Reservoir pipe junction, and piping network.
Week 3	**Flow measurement** Why it is important? Custody Transfer Measuring System Obstructive devices, and Non-obstructive devices. Pitot tube
Week 4	**Flow measurement of close channel** Venture meter, Orifice meter.
Week 5	**Flow measurement of close channel** Nozzle meter, Rotameter.
Week 6	**Flow measurement of open channel** Weir and Notch.
Week 7	**Mid Exam**
Week 8	**Non- Newtonian liquids** Introduction, types of Non-Newtonian liquids, apparent viscosity.

Week 9	**Non- Newtonian liquids** Velocity distribution.
Week 10	**Non- Newtonian liquids** friction factor, and the pressure losses.
Week 11	**Dimensional Analysis** The Principle of Dimensional Homogeneity, Why do we need to do dimensional analysis? Dimensionless group using Rayleigh Method.
Week 12	**Dimensional Analysis** Dimensionless group using Buckingham Pi Theorem.
Week 13	**Pumps** Types, application, similarity rules, starting point for one and two pumps connected in parallel or sequence.
Week 14	**Compressible fluid** Introduction, applications, energy losses of its flow, derivation of sonic equation, supersonic and subsonic flow and the types of measurement.
Week 15	**Preparatory week before the final Exam**
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	**Hydraulic bench, Volumetric flow rate measurement.**
Week 2	**Osborne-Reynolds and laminar flow Demonstration.**

Week 3	**flow through a Venture meter.**
Week 4	**Head losses in bends.**
Week 5	**Energy losses in piping system.**
Week 6	**Fluid friction in a smooth & roughened pipe/flow measuring and valves.**
Week 7	**Bourdon manometer calibration (dead weight).**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Streeter, V. "Fluid Mechanic", 6th edition, Mc-Graw Hill, 1975 . • Frank M. White "Fluid Mechanics", 5th edition, McGraw Hill. 1997. • Coulson & Richardson's Chemical Engineering - Vol. 1, Fluid Flow, Heat Transfer and Mass Transfer - 6th edition, Butterworth-Heinemann, 1999. • R. C. Hibbeler "FLUID MECHANICS", 2nd edition in SI units, Pearson Education, 2021.	
Recommended Texts	Frank M. White "Fluid Mechanics", 5th edition, McGraw Hill. 1997.	
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition

Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information
معلومات المادة الدراسية

Module Title	Petro physics of Reservoir Engineering	**Module Delivery**	
Module Type	**Core**	☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	PERE224		
ECTS Credits	**5**		
SWL (hr/sem)	**125**		

Module Level	UGII	**Semester of Delivery**	2
Administering Department	PE	**College**	OGE
Module Leader	Fadhil S. Khadhim	**e-mail**	E-mail
Module Leader's Acad. Title	Prof	**Module Leader's Qualification**	Phd
Module Tutor	NA	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	PRPE112, STGE215	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This module is aiming to: 1- Know the fundamentals of reservoir engineering. 2- Know the types of rocks properties. 3- Deal with intervention of rock properties on initial fluid in place estimation and interpretation. 4- How to deal with Darcy law output and interpretation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	To know the rocks Petrophysics properties and related reservoir properties and calculations, which comprised: 1. Reservoirs types and classifications 2. Porosity definition and types 3. Darcy low derivation 4. Permeability classifications, definition and types 5. Water saturation determination and types 6. Compressibility types. 7. Capillary pressure, wettability and surface tension. 8. J-function determination and plot. 9. Determination of hydrocarbon in place. 10. Fluid flow regimes in porous media. 11. Determination of fluid contacts from pressure test data.

Indicative Contents المحتويات الإرشادية	**Indicative content includes the following:** **Part I: Reservoirs classification and Rocks Petrophysics properties:** In this part, the students will provide by the reservoirs classifications and rocks petrophysics properties such as porosity, permeability, water saturation, J- function, capillary pressure, surface tension, wettability, and compressibility. **Part II: Estimation of hydrocarbon in place and fluid flow regimes.** In this part, the students will provide by the volumetric method for calculating hydrocarbon in place and three steady state fluid flow regimes for compressible, slightly compressible and incompressible fluids in radial and liner geometries. Part III: Determination of fluid contacts from pressure test data. In this part, the students will provide by the pore pressure types and graphical method for determination fluid contacts.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to Encourage students to ask and answer questions, as well as presenting many explanatory videos to increase students' knowledge, and also to introduce the student to the most important petroleum terms, abbreviations and symbols that he will need to complete the rest of the academic stages Or to work in the future as an oil engineer.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2,3 10 and 11
	Assignments	2	10% (10)	4, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction**
Week 2	**Reservoirs Classification**
Week 3	**Porosity**
Week 4	**Permeability**
Week 5	**Average and absolute permeability**
Week 6	**Fluid Saturation Determination and Initial Saturation Distribution in a Reservoir**

Week 7	**Rock compressibility, wettability, Surface tension and capillary pressure**
Week 8	**J- Function, and Formation Resistivity**
Week 9	**Hydrocarbon In place Calculations**
Week 10	**Fluid Flow Regimes in Porous media**
Week 11	**Compressible fluid flow in radial and linear Geometry**
Week 12	**Incompressible fluid flow in radial and linear Geometry**
Week 13	**Slightly Compressible fluid flow in radial and linear Geometry**
Week 14	**Fluids Contact Identification**
Week 15	**Preparatory week before the final Exam**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Core analysis, cutting and preparation**
Week 2	**Core Cleaning and Drying**
Week 3	**Calibration of Pressure Gauge**
Week 4	**Bulk Volume Measurement for Regular Cores**
Week 5	**Bulk Volume Measurement for Regular Cores**
Week 6	**Bulk Volume Measurement for Irregular Cores**
Week 7	**Porosity Measurement by Mercury Injection**
Week 8	**Porosity Measurement by Air Injection**
Week 9	**Porosity Measurement by Water Injection**
Week 10	**Fluid Saturation Measurement**

Week 11	**Permeability Measurement by Water Flowing**
Week 12	**Permeability Measurement by Gas Flowing**
Week 13	**Capillary Pressure Measurement**
Week 14	**Grain volume Measurement**
Week 15	**Density Measurement**
Week 16	**Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	1. J.H. Schon , (Physical Properties of Rocks), Elsevier, Oxford, UK. 2011 2. Kadhim F.S., and Samsuri A. Cementation Factor Relationships to Carbonate Rock Properties, Lambert Academic Publication, Germany, 2015. 3. Amyx, J.W., Bass, D.M., Jr., and Whiting, R.L.: Petroleum Reservoir Engineering, Physical Properties, McGraw-Hill, New York, 1960. 4. Towler, B.F.: Fundamental Principles of Reservoir Engineering, SPE Textbook Series Vol. 8 (2020)	No
Recommended Texts	1. Ahmed T. Reservoir Engineering Handbook, 2010.	Yes
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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Module Information معلومات المادة الدراسية					
Module Title	Physics and Thermodynamics			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	PHTH225				
ECTS Credits	5				
SWL (hr/sem)	130				
Module Level		UGII	**Semester of Delivery**		2
Administering Department		PE	**College**	OGE	
Module Leader	Prof. Dr. Najem Al-Rubaiey		**e-mail**	E-mail: 100108@uoteechnology.edu.iq	
Module Leader's Acad. Title		Prof.	**Module Leader's Qualification**		PhD

Module Tutor	2	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	OPDE212	**Semester**	
Co-requisites module	1- It provides abroad foundation in the basic of science and engineering.	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The program has a strong emphasis on modern physics and its application to 21st century technology. 2. Our program builds on the existing research and teaching strengths of the Physics and Materials Science Division in cross-cutting areas such as novel 21st century materials, materials for energy, macromolecules, quantum mechanics to devices, surfaces, interfaces, and nanostructures, and computation, and is flexible enough to grow together with the research base of our division.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Graduates will have substantial experience with laboratory methods, data analysis, and computation.

Indicative Contents المحتويات الإرشادية	Engineering physics students will be well equipped to pursue research and development careers in new and emerging technologies such as properties of new materials, quantum electronics, nanofabrication and devices, quantum signal processing and quantum computing, related to emerging advances in electrical, mechanical and petroleum engineering.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Active learning techniques methods

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	90	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	130		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects /	1	10% (10)	Continuous	All

	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	History of nature science, electrical, charge, current.
Week 2	Resistance, resistivity, galvanometer, ammeter, voltmeter.
Week 3	Simple harmonic motion.
Week 4	Kinetic and potential energy
Week 5	Electric and magnetic properties of matter
Week 6	Insulators, semiconductor, conductor, superconductor.
Week 7	Diamagnetic, paramagnetic, ferromagnetic
Week 8	Nanotechnology
Week 9	Introduction: Zeroth law of thermodynamics: Definition of temperature, Zeroth law concept, Type of thermometers, Type of temperature scales, Kelvin experiment: gas thermometer
Week 10	Ideal gas Equation: Properties of matter, Temperature effect on matter, Thermal expansion laws Macroscopic description of ideal gas, Derivation of Ideal gas equation
Week 11	Heat: Heat and internal energy, Units of heat, Mechanical equivalent of heat, Specific heat capacity, Calorimetry, Latent heat Work: State variables, Transfer variables, Work in thermodynamics, PV diagrams, Energy transfer .
Week 12	The 1st law of thermodynamics: Isolated and open systems, Adiabatic processes, Adiabatic free expansion process Isobaric processes, Isochoric processes, Isothermal processes, Thermal expansion
Week 13	Engines and refrigerators: Work to heat, Heat engine, Thermal efficiency of heat engine, Heat pump (refrigerators), Refrigerator cycle (Sterling), Coefficient of performance
Week 14	2nd law of thermodynamics: Entropy Kelvin-Planck & Clausius forms, Reversible and irreversible processes Carnot engine and theorem, Carnot efficiency
Week 15	**Preparatory week before the final Exam**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Electric Charge and Field, Guide to Semiconductor Engineering, Magnetic and Electric book. Publish Papers	Yes
Recommended Texts	Physics text book, Series of nanotechnology	
Websites	Elsevier, Springer, Physics library online, https://openlibrary.org/subjects/physics ,	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information
معلومات المادة الدراسية

Module Title	Partial Differential Equations	**Module Delivery**	
Module Type	**Basic**	☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	PADE226		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGII	**Semester of Delivery**	4
Administering Department	PE	**College**	OGE
Module Leader	Jassim M. Al Said Naji	**e-mail**	E-mail: 150100@uotechnology.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	2	**e-mail**	E-mail
Peer Reviewer Name	Dr. Fadhil S. Kadhim	**e-mail**	150010@uotechnology.edu.iq
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	ORDE212	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Important objectives of the calculus sequence are to develop and strengthen students' problem-solving skills and to teach them to read, write, speak, and think in the language of mathematics. In particular, students learn how to apply calculus tools to a variety of problem situations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	10. Find limits of functions (graphically, numerically, and algebraically) 11. Analyze and apply the notions of continuity and differentiability to algebraic and transcendental functions. 12. Determine derivatives by a variety of techniques including explicit differentiation, implicit differentiation, and logarithmic differentiation. Use these derivatives to study the characteristics of curves. Determine derivatives using implicit differentiation and use them to study the characteristics of a curve. 13. Students will use a variety of methods to solve the Laplace and Poisson equations. 14. Harmonic function characteristics will be examined by the students. 15. The heat and wave equations will be solved, and students will examine their characteristics. 16. The characteristic approach will be used by students to resolve first order partial differential equations. 17. Students will evaluate conservation laws' characteristics. 18. Students will examine some other nonlinear PDEs' properties

	if time allows.
Indicative Contents المحتويات الإرشادية	1. To model and comprehend scenarios involving exponential growth or decay and second order physical systems, use established DE types. 2. Use a variety of input functions, such as zero, constants, exponentials, sinusoids, step functions, impulses, and superpositions of these functions, to solve the major equations. 3. Use the characteristic equation, exponential response formula, Laplace transform, convolution integrals, Fourier series, complex arithmetic, parameter variation, elimination, and anti-elimination methods to solve the differential equations mentioned above. 4. Be able to solve linear DEs using the fundamental ideas of linearity, superposition, and the existence and uniqueness of DE solutions.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Highlight conceptual comprehension. • Assign homework that is difficult and builds on the lessons you gained in class. • Cooperative learning strategies ought to be applied. • Submit intelligent queries. • Put your focus on logical reasoning and practical problem-solving. • Use a range of assessment techniques.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3

الفصل			
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #3 and 10
	Assignments in collage	10	10% (10)	Continuous	All
	Assignments in home	10	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	- General Review
Week 2	- Special Functions I
Week 3	- Special Functions I
Week 4	- Fourier Analysis and Series
Week 5	- Fourier Transform I
Week 6	- Inverse of Fourier Transform
Week 7	- Laplace Transform

Week 8	- Inverse of Laplace Transform
Week 9	- Methods of Solving PDE: (Direct integration method, Variables separable, Fourier Transform, Laplace Transform, ODE methods)
Week 10	- One Dimension Heat Equation, Two Dimension Heat Equation (Laplace equation) by Variable separable
Week 11	- One Dimension Heat Equation, Two Dimension Heat Equation (Laplace equation) by Transforms
Week 12	- One Dimension Wave Equation by Variable separable, Wave Equation: D. Alembert's formula
Week 13	- One Dimension Wave Equation by transforms
Week 14	- Single Phase Fluid Flow Equation Solution
Week 15	- Final Exam
Week 16	- **The preparatory week before the Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	4- George B. Thomas, "THOMAS' CALCULUS ", Eleventh Edition 2011, Dorling Kindersley (India). 5- Spiegel, M. R. Schaums outline series, theory and problems of Lablace transform, copy write 1965 by Mc Graw-Hill Inc. 6- Spiegel, M. R. Schaums outline series, theory and problems of Fourier analysis with application to boundary value problem, copy write 1974 by Mc Graw-Hill Inc.	
Recommended Texts	4- Ford , S.R. and Ford , J.R. " Calculus " , (1963) McGraw-Hill. 5- K.Back house and S.P.T. Houldsworth " Pure Mathematics a First Course " (1979) , S1	

	Edition , Longman Group . 6- Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons. Inc., 9th ed., 2006.	
Websites	3- https://en.wikipedia.org/wiki/Differential_equation 4- https://byjus.com/maths/differential-equation/	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information

معلومات المادة الدراسية

Module Title	**اللغة العربية**	**Module Delivery**
Module Type	**Basic**	☒ **Theory**

Module Code	**ARLA104**			☐ **Lecture** ☐ **Lab** ☐**Tutorial** ☐ **Practical** ☐ **Seminar**
ECTS Credits	**2**			
SWL (hr/sem)	**50**			
Module Level	UGII	**Semester of Delivery**	1	
Administering Department	PE	**College**	OGE	
Module Leader		**e-mail**		
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.	
Module Tutor	1	**e-mail**		
Peer Reviewer Name	Dr. Fadhil S. Kadhim	**e-mail**	150010@uotechnology.edu.iq	
Scientific Committee Approval Date		**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	**1- تمكين الطالب من الوقوف على حقيقة أحكام اللغة.** **2- صون اللسان عن الخطأ والنطق الصحيح بالحرف العربي** **3- أن يطبق القواعد النحوية والإملائية التي يدرها الطالب تطبيقا سليما.** **4- أن تتعزز فيه الميول الأدبية والمواهب .** **5- التذوق الجمالي والقدرات اللغوية المتميزة.**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1- المعرفة والفهم** **2-الوقوف على قواعد اللغة** **3- اعتزاز الطالب بالأمة العربية والإسلامية** **4-الحفاظ على الهوية الإسلامية** **5- الوقوف على حقيقة الإعجاز القرآني.** **6 – تمكين الطالب من معرفة قواعد اللغة** **7– ان يكتسب ثروة لغوية تمكنه من التعبير السليم في المواقف التي يمر بها في حياته**
Indicative Contents	**1- أن يكتسب الطالب مهارة في إتقان قواعد اللغة.**

2- قادرا أن يعطي مثالا لكل باب من أبواب اللغة 3-أن يتدرب على إخراج موضوعات اللغة من النصوص 4- اعتزاز الطالب بهويته الوطنية والإسلامية ولغته .	المحتويات الإرشادية

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	1- الشرح والتوضيح واستخدام السبورة 2- طريقة عرض المادة والمحاضرة 3- الطريقة التقليدية ، الكتاب المنهجي إضافة إلى مصادر خارجية

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 12	LO #1 and 4
	Seminar	2	10% (10)	2, 10	LO # 1, 3 and 4
	Online assignments	2	10% (10)	3, 7	LO # 2, 4 and 7
	Report	1	10% (10)	13	LO # 1 and 3
Summative assessment	**Midterm Exam**	2 hr	20% (20)	7	LO # 1,3 and 4
	Final Exam	3 hr	50% (50)	16	LO # 1,3 and 4

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	مهارات اللغة العربية ومميزاتها
Week 2	الادب والشعر في العصر الجاهلي (قصيدة للحفظ من العصر الجاهلي)
Week 3	اللغة العربية لغة القرآن الكريم (نص قرآني كريم للحفظ وقصيدة للحفظ من العصر الاسلامي)
Week 4	اللغة العربية لغة الضاد – الفروقات في اللغة العربية
Week 5	اسماء الاشارة وحروف الجر والعطف ومعانيها
Week 6	المبتدأ والخبر
Week 7	كان واخواتها
Week 8	ان واخواتها
Week 9	العدد والمعدود
Week 10	الاخطاء الشائعة باللغة العربية
Week 11	امتحان منتصف الفصل
Week 12	الاملاء في اللغة العربية
Week 13	علامات التنقيط في اللغة العربية
Week 14	كيفية كتابة الانشاء بلغة صحيحة
Week 15	**قصيدة من الشعر العربي الحديث**
Week 16	الامتحان النهائي

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the**

		Library?
Required Texts	•	
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information
معلومات المادة الدراسية

Module Title	**اللغة العربية**	**Module Delivery**	
Module Type	**Basic**	☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐**Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**ARLA204**		
ECTS Credits	**2**		
SWL (hr/sem)	**50**		
Module Level	UGII	**Semester of Delivery**	1
Administering Department	PE	**College**	OGE
Module Leader		**e-mail**	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	1	**e-mail**	
Peer Reviewer Name	Dr. Fadhil S. Kadhim	**e-mail**	150010@uotechnology.edu.iq
Scientific Committee Approval Date		**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	**1- تمكين الطالب من الوقوف على حقيقة أحكام اللغة.** **2- صون اللسان عن الخطأ والنطق الصحيح بالحرف العربي** **3- أن يطبق القواعد النحوية والإملائية التي يدرها الطالب تطبيقا سليما.** **4- أن تتعزز فيه الميول الأدبية والمواهب .** **5- التذوق الجمالي والقدرات اللغوية المتميزة.**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1- المعرفة والفهم** **2-الوقوف على قواعد اللغة** **3- اعتزاز الطالب بالأمة العربية والإسلامية** **4-الحفاظ على الهوية الإسلامية** **5- الوقوف على حقيقة الإعجاز القرآني.** **6 – تمكين الطالب من معرفة قواعد اللغة** **7– ان يكتسب ثروة لغوية تمكنه من التعبير السليم في المواقف التي يمر بها في حياته**
Indicative Contents المحتويات الإرشادية	**1- أن يكتسب الطالب مهارة في إتقان قواعد اللغة.** **2- قادرا أن يعطي مثالا لكل باب من أبواب اللغة** **3-أن يتدرب على إخراج موضوعات اللغة من النصوص** **4- اعتزاز الطالب بهويته الوطنية والإسلامية ولغته .**

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	**6- الشرح والتوضيح واستخدام السبورة** **7- طريقة عرض المادة والمحاضرة** **8- الطريقة التقليدية ، الكتاب المنهجي إضافة إلى مصادر خارجية**

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 12	LO #1 and 4
	Seminar	2	10% (10)	2, 10	LO # 1, 3 and 4
	Online assignments	2	10% (10)	3, 7	LO # 2, 4 and 7
	Report	1	10% (10)	13	LO # 1 and 3
Summative assessment	**Midterm Exam**	2 hr	20% (20)	7	LO # 1,3 and 4
	Final Exam	3 hr	50% (50)	16	LO # 1,3 and 4
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	مقدمة عن الفصل (امثلة نصوص في نهج البلاغة)
Week 2	كتابة الهمزة 1
Week 3	كتابة الهمزة 2
Week 4	المعفول به
Week 5	المضاف والمضاف اليه

Week 6	الاسماء الخمسة
Week 7	الافعال الخمسة
Week 8	الحال
Week 9	الاستثناء
Week 10	**امتحان منتصف الفصل**
Week 11	التمييز
Week 12	علم الأسلوب والمنطق
Week 13	الخطابة والالقاء
Week 14	لمحة عن حياة المتنبي وقصائده
Week 15	لمحة عن حياة الجواهري وقصائده
Week 16	الامتحان النهائي

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	•	
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

Fail Group **(0 – 49)**	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Course Description Form

1. Course Name:
Drilling I
2. Course Code:
PE341
3. Semester / Year:
1st Semester
4. Description Preparation Date:
23/3/2024
5. Available Attendance Forms:
Class Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
60 semester hours. 4 hours a week
7. Course administrator's name (mention all, if more than one name)
Name: Assist Prof. Dr. Emad Al-Khdheeawi Email: 150070@uotechnology.edu.iq

8. Course Objectives

Course Objectives	1- A fundamental understanding of petroleum well drilling procedures, its mechanics, and design methodology. 2- An overview of drilling rig operations and related equipment; offshore drilling and advanced drilling tools; 3- Drill-string design; 4- Drill bit technology; 5- Pore pressure and fracture pressure calculations.

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourag students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials, and laboratory investigations.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3	4 hrs 4 hrs 4 hrs	1- Explain key aspects drilling operations, c	1- Introduction; Overview of Dril Engineering	Explanation of scientific material and	Attendance, classes, homework, an

4 5 6 7 8 9 10 11 12 13 14 15	4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs	rig types a fundamental differences betw onshore and offsh drilling. 2- Explain the concepts equipment required hoisting syste including determinat of loads and hois power. 3- Explain the mechanics design of drill bits, h different drill bits funct and key issues associa with drill bit selection. 4- Analyze critical sa parameters associa with drilling, such as p pressure and fract pressure.	2- Drilling Equipment, 3- Basics of Drill Stı Design 4- Types of Rot Drilling Rigs 5- Drilling Process 6- Data Required Drilling Problems 7- Drilling Bit 8- IADC Classificat Rotary Bits, Grading and 9- Bit Wear Calculatio 10- Optimum Bit Life 11- Bit Hydraulics 12- Hydrostatic Pressur 13- Subsurface Pressur 14- Formation Pore Fracture Press Estimation 15- Hole proble Overview	class discussio And classroom and extracurricula projects	the med exam And the end-of semester exam

1. Course Evaluation

Distribution is as follows: 15 marks for daily assignments, assignments, and attendance evaluation. 20 marks for the med exam. 65 marks for final exams.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Bourgoyne, Adam T., Keith K. Millheim, Martin E. Chenevert, and Farrile S. Young. "Applied drilling engineering." 2. Rabia, Hussain. Well engineering & construction. London: Entrac Consulting Limited.
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Drilling Mud I
2. Course Code:
PE343
3. Semester / Year:
1st Semester
4. Description Preparation Date:
23/3/2024
5. Available Attendance Forms:
Class Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
45 semester hours. 3 hours a week (1 hr. Theoretical + 2 hrs. Lab)
7. Course administrator's name (mention all, if more than one name)
Name: Lect. Doaa Saleh Mahdi Email: 150082@uotechnology.edu.iq
8. Course Objectives

Course Objectives	1- Teaches the drilling fluids types 2- Drilling fluids Properties and their theoretical calculations 3- Experimental procedure. 4- The course introduces different mathematical and experimental methods to optimize the drilling fluid in order to minimize drilling fluids problems.

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourag students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive Lab work.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4	3 hrs 3 hrs 3 hrs 3 hrs	1. Understand drilling fluid types and properties 2. Using mathematical	1. Properties of Drilling Fluids 2. Field Tests on Drilling Fluids	Explanation of scientific material and class discussio	Attendance, classes, homework, an the med exam

5 6 7 8 9 10 11 12 13 14 15	3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs	calculations for drilli Mud properties 3. Understand the experimental measurements of drilling fluid propert	3. Water Based Mud and Oil Based Muds 4. Solids Control and Programming a Drilli Fluid 5. Functions of Drilling Fluids 6. Types of Drilling Mud 7. Rheological propertie 8. Rheological model 9. Power law model 10. Mud Density Calculations 11. Reduced mud density (Dilution) 12. Design of Mud Weight 13. Mud Density and Mud Viscosity 14. Rheology Calculation 15. Hydrostatic Pressure	And classroom and extracurricula projects	And the end-of semester exam

1. Course Evaluation

Distribution is as follows: 15 marks for daily assignments, assignments, and attendance evaluation. 15 marks for the med exam. 20 marks for Laboratory report and Exam. 50 marks for final exams.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Fundamentals of Drilling Engineering", M. Enamul Hossain. 2. Well engineering and construction", Huss Rabia.
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Gas Engineering
2. Course Code:
PE346
3. Semester / Year:
1st Semester – 2023/2024
4. Description Preparation Date:
24−3−2024
5. Available Attendance Forms:
Class attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
3 hrs weekly / 45 unit
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Jihad Husain Al-Joumaa Email: 150078@uotechnology.edu.iq
8. Course Objectives

Students will have learned all about gas reservoirs and the properties, how to accumulate, produced and processed **They will have the ability to solve material balance and volume equation for gas** **will learn how to test wells for gas inspection and be familiar with gas laws from simple to complicated ones**	• ..... • ..... • .....

9. Teaching and Learning Strategies	
Strategy	1- Discussion. 2- Brain storming by encouraging students to produce a large number of ideas about some issue or problem raised during the lecture. 3- Self-learning by teaching the student by his own according to his special abilities and mental and cognitive levels responding to his preferences and interests to achieve development and integration of his capabilities. 4- Cooperative learning by team working.

10. Course Structure

Week	Hours	Required Learning	Unit or subject name	Learning method	Evaluation method

		Outcomes			
1	3	1) An ability to distinguish, identify, define, formulate, and solve engineering problems by applying principles of engineering, science and mathematics. 3) An ability to create and carry out proper measurement and tests with quality assurance, analyze and interpret results, and utilize engineering judgment to make inferences. 4) An ability to skilfully communicate ora with a gathering people and in writing with various manager levels.	Hydrocarbon gases 1- Ideal gases (Boyle's law, Charles equation, Avogadro law) 2- EOS of ideal gases 3- Mixture of ideal gases (Dalton's law, amagate law) 4- Apparent molec weight of gas mixt specific gravity of ga	1- Discussion. 2- Brain storming by encouraging students to produce a large number of ideas about some issue or problem raised during the lecture. 3- Self-learning 4- Cooperativ learning team worki	Quizzes, Assignments, Report ,presentations Midterm Exam, and Final Exam
2	3		Behavior of real gases 1- Review of Gas properties (Bg, Eg, Mg) PVT , Apparent molecular weight, standard volume, z factor, gas specific gravity, specific volume, natural gas compressibility 2- Phase behavior and types of reservoirs based on PT diagrams 3- gas volumetric		
3-4	6		gas reservoir performance 1- flow regi characteristics a equations (stea unsteady, pseu steady flow)		
5	3		calculating IC volumetric by meth		
6	3		calculating u recovery fr volumetric reservo		
7-8	6		MBE in gas reservoirs 1- volumetric gas reservoirs 2- linearization of MBE 3- MBE under wa		

			drive		
9-10	6		wet gas and gas condensate 1- field identification of wet gas reservoirs 2- gas equivalent of produced condensate and water 3- retrograde condensation and retrograde vaporization 4- field identification of retrograde reservoirs 5- Initial gas and oil calculations 6- Initial gas and oil calculations in high pressure separators 7- performance Volumetric condensate reservo		
11	3		calculations of tv phase derivat factor		
12-13	6		transient well testir		
14-15	6		Gas Production Review pressure types effect, gas compress tubing and flowing and measuring, f operation proble treatment of nat gas)		

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

(20 mid exam - 65 final exam - 10 presentations and reports - 5 quizzes)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Applied Petroleum Reservoir Engineeri Benjamin Cole Craft, Murray Free Hawki

	Ronald E. Terry, Prentice Hall, 1991 - reservoir engineering - 431 pages
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Geophysics	
2. Course Code:	
PE 321	
3. Semester / Year:	
1st semester	
4. Description Preparation Date:	
30/3/2024	
5. Available Attendance Forms:	
Class Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hrs weekly / 45 unit	
7. Course administrator's name (mention all, if more than one name)	
Name: lecture doctor Hiba Tarq Jaleel Email: 150089@uotechnology.edu.iq	
8. Course Objectives	
Course Objectives	Students will have learned all about exploration geophysical methods and the eart physical properties, how to measure, processed and interpret field data. They will have the ability to calculate seismic wave velocity, layers depth and lithology type. Translate time seismogram to depth seismogram Recognize between structure and stratigraphic features in the seismogram with detect hydrocarbon indicators (flat, dim and bright spots).
9. Teaching and Learning Strategies	
Strategy	1- The main strategies that will be adopted in delivering this module are including Discussion the information of geophysical methods in general, and their characterizatio and specifications of properties. Starting from basic various geophysical principles and methods used in revealing shallow to deep interior of the earth, carry out geophysical surveys and making choice of methods in the exploration of oil and gas, the instrument that use in the field and the ability to collect, analyze and interpret various data. seismic method (refraction and reflection), seismic waves type, theory of elasticity, type of sour wave velocity and how we use it to recognize lithology type, take all the principles and equations that the student need to calculate layers velocity and depth. 2- Brain storming by encouraging students to produce a large number of ideas about sor issue or problem raised during the lecture. 3- Self-learning by teaching the student by his own according to his special abilities and mental and cognitive levels responding to his preferences and interests to achieve development and integration of his capabilities. 4- Cooperative learning by team working.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	3	The student will have the ability to read final stack seismogram, make structure and stratigraphic interpretation with detect hydrocarbon indicators (HCI) (bright, flat and dim) spots. Determine lithology using seismic and acoustic velocity from both horizontal and vertical exploration method. Petroleum related rock mechanics, Introduction Physical properties of rocks , Deformation of rocks	Exploration Methods (Seismic, Gravity, Magnetic, Electric, Radioactivity) Instruments, Applications and Principles Depend On It with Interpretation the Result	Introduction to Geophysical Science and Technology	Attendance, classes, homework, Accounting reports and assignments and the mid exam And the end-of-semester exam.
2	3	Applying various mathematical equations for important calculations includes evaluating the formation and unifying the velocity, depth, and thickness of the formations, with calculations related to the strength, density, and type of rock for each location, with the possibility of determining the best drilling area to reach the formation at an economical cost.	Stress component and Strain Types Hooke's law for isotropic media The elastic moduli(Young's modulus E, The shear modulus μ, Poisson's ratio σ, Lames elastic coefficients λ, The bulk modulus B) Mathematical interrelationships of elastic moduli	Theory of elasticity and Fundamental conditions	

3	3		Classification of the common seismic waves Body wave(primary and secondary waves) Surface waves (love and Rayleigh waves)	Seismic waves	
4	3		Introduction Physical properties of rocks Stresses and strains Applications of theory of elasticity in rock mechanics Seismic rock properties		
5	3		concept of Wave fronts Huygens's Principle Plane wave propagation according to Huygens principle	wave terminology	
6	3		Concept of the interface Acoustic impedance Snell's law the critical refraction angle equation Reflection coefficient Transmission coefficient	wave terminology	
			Factors affecting seismic	Seismic Waves Velocity	

7	3		velocity Rock lithology type CalculatePoisson's ratio (σ) from seismic wave velocity		
8	3		Calculate seismic wave velocity from elastic moduli Type of velocity function	Seismic Waves Velocity	
9	3		calculating reflection velocity using Normal Move out methods calculate layers depth (for horizontal and dipping layers) Seismic refraction method Refraction data acquisition First break picking for good and poor data	Normal Move out methods	
10	3		calculate intercept time and critical distance calculating refraction velocity Calculate layers depth (for two , three and four layers) for horizontal and dipping layers.	Normal Move out methods	
11	3		Interpretation of Seismic Reflection Data(Seismic Structural	Interpretation of Seismic Reflection Data(Seismic Structural Interpretation)	

			Interpretation) Seismic structure interpretation tools Seismic structure interpretation features type (folding ,faulting and horizontal reflection horizon) The Important of Isopach Maps, Time Map, Depth Map and Velocity Maps) (Result a Depth Maps From Time Maps)		
12	3		Interpretation of Seismic Reflection Data(Seismic Stratigraphic Interpretation) Seismic Stratigraphic interpretation tools	Interpretation of Seismic Reflection Data(Seismic Stratigraphic Interpretation)	
13	3		Basic Stratigraphic Concepts Reflection configuration patterns Seismic Stratigraphic features type (salt domes, reefs, Sand Lenses and Unconformity)	Interpretation of Seismic Reflection Data(Seismic Stratigraphic Interpretation)	
			hydrocarbon	hydrocarbon indicator (HCI)	

14	3		indicator (HCI) (HCI) tools (waveform parameters, as amplitude, frequency, phase, and propagation velocity)		
15	3		(HCI) types (bright, flat and dim spots)	hydrocarbon indicator (HCI)	

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

(20 mid exam - 65 final exam - 10 presentations and reports - 5 quizzes)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Alsadi H.N. "Seismic Hydrocarbon Exploration 2D and 3D Techniques" Springer International Publishing Switzerland 2017, 341p.p.
Main references (sources)	Telford, W. M., Geldart, L. P., Sheriff, R. E., 1990," Applied Geophysics" 2nd edition, Cambridge University press, 770
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

نموذج وصف المقرر

1. Course Name :
Reservoir Fluid Properties
2. Course Code:
PE 345
3. Semester / Year:
Semester
4. Description Preparation Date:
21 March 2024
5. Available Attendance Forms:
In class attendance only
6. Number of Credit Hours (Total) / Number of Units (Total)
Theoratical (30 hrs) + Tutorial (30 hrs) / Units (45)
7. Course administrator's name (mention all, if more than one name)
Name:- Prof.Dr. Ghazwan Noori saad E-mail:- Ghazwan.jreou@uokufa.edu.iq
8. Course Objectives

Course Objectives	The objective of this course is to help student to be • familiar with reservoir fluid properties and, • how PVT and laboratory data are used for tuning EOS and, • predictive models. • Moreover, PVT envelope analysis and experimental work design

9. Teaching and Learning Strategies

- Lectures: during week, the theoretical and practical lectures will be presented throughout the semester; the discussion practical work within lab will be organized and illustrated with activities.
- Assignments: after the lectures, the assignment will be explained and given to students. It is expected to be done on weekly bases.
- Quizzes: the contents of each lecture will be discussed during class for open question and answer to make sure every student will participate and be active.
- Practical Discussion: during practical session the students will combine together as partners and form a group to discu their class learning and open tutorial on the topics.
- In class brainstorming sessions: provide students with enough sources and background knowledge briefly within the topics during class to top up their challenge packs to be more active.

Strategy

10. Course Structure

Evaluation method	Learning method	Unit or subject name	Required Learning Outcomes	Hours	Week
• Daily(quizzes) and Midterm exams • Reports and homework • Commitment to the lecture ti	Teaching methods according to modern and electronic methods, using only the university's approved platforms and those available	1 **Components of Naturally Occurring Petroleum Fluids** **Organic Chemistry** Structural Theory-Chemical Bonding-Naming Organic Chemicals-Hydrocarbons-Homologous Series **Alkanes** Nomenclature of Alkanes Physi and Chemical Properties of	**1- Employ equations of state to describe and simulate gas-liquid equilibrium** **2- Describe the fundamentals of Reservoir Thermodynamics & Fluid Properties** **3- Identify the reservoir fluid types.** **4- Conduct full flash calculation and PVT analysis.**	**2**	1.

		Alkanes **Alkenes** Nomenclature of Alkenes-Physi and Chemical Properties of Alkenes Alkadienes, Alkatrienes, and Alkatetraenes **Alkynes** Nomenclature of Alkynes - Physical and Chemical Propertie of Alkynes Cycloaliphatic Hydrocarbons Cycloalkanes-Condensed Rings-Cycloalkenes and Cycloalkadien **Aromatics** Benzene - Benzene Bonds-Nomenclature of Aromatic Hydrocarbons-Physical and Chemical Properties of the Aromatic Hydrocarbons **Cycloalkanoaromatics** Other Organic Compounds Nonhydrocarbon Components o Petroleum	**5- Demonstrate the ability to work cooperatively in groups during laboratory sessions to determine solutions for practical activities.** **6- Apply knowledge of thermodynamics, equations of state and reservoir fluid types to practical laboratory exercises and SGDE.** **7- Calculate Reservoir Fluid Properties at a given pressure and temperature** **8- Plan required PVT test**		

		Sulfur Compounds-Oxygen Compounds-Nitrogen Compoun Organometallic Compounds **Resins and Asphaltenes** Classification of Crude Oils Physical Classification-Chemica Classification			
= = =	= = =	2 **Phase Behavior** **Pure Substances** Phase Diagram for a Pure Substance Use of Phase Diagrams Vapor Pressure of a Pure Substance-Pressure- Volume Diagram for a Pure Substance-Density-Temperature Diagram f a Pure Substance **Two-Component Mixtures** Phase Diagrams of Two-Component Mixtures - Pressure-Volume Diagram for a Two-Component Mixture-Compositio Diagrams	= = =	**6**	2-3

		Three-Component Mixtures Ternary Diagrams-Three-Component Phase Diagrams- Uses of Ternar Diagrams **Multicomponent Mixtures**			
= = =	= = =	**3 Equations of State** **The Ideal Gas** Boyle's Equation-Charles' Equation-Avogadro's Law-The Equation of State for an Ideal Gas-Density of an Ideal Gas-Kinetic Theory of Gases **Mixtures of Ideal Gases** Dalton's Law of Partial Pressures-Amagat's Law of Partial Volumes-Apparent Molecular Weight of a Gas Mixture-Specific Gravity of a Gas **Behavior of Real Gases** The Compressibility Equation of State-The Law of Corresponding States-The Compressibility Equation of State for **Gas Mixtures.**	= = =	**3**	4

= = =	= = =	**5 The Five Reservoir Fluids** Multicomponent Phase Diagrams The Five Reservoir Fluids Identification of Fluid Type **Black Oils** Black Oil Phase Diagram-Comments-Field Identification of Black Oils-Laboratory Analysis of Black Oils **Volatile Oils** Volatile Oil Phase Diagram Comments Field Identification of Volatile Oils-Laboratory Analysis of Volatile Oils **Retrograde Gases** Retrograde Gas Phase Diagram-Field Identification of Retrograde Gases-Laboratory Analysis of Retrograde Gases-Comments **Wet Gases** Wet Gas Phase Diagram Comments Field Identification of Wet Gases	= = =	**3**	5

		Dry Gases Dry Gas Phase Diagram Comments			
		6 Properties of Dry Gases **Standard Conditions** Dry Gases Gas Formation Volume Factor-The Coefficient of Isothermal Compressibility of Gas-The Coefficient of Viscosity of Gas Heating Value Joule-Thomson Effect		**3**	6
= = =	= = =	**7 Properties of Wet Gases** Recombination of Surface Fluids-Compositions Known Surface Compositions Known-Separator Compositions Known Recombination of Surface Fluids-Compositions Unknown Separator Gas and Stock-Tank Vent Gas Properties	= = =	**3**	7

		Known-Properties of Stock-Tank Gas Unknown Formation Volume Factor of Wet Gas Surface Compositions Known-Compositions Unknown **Plant Products** **Retrograde Gases**			
		MID Exam		**2**	8
= = =	= = =	**8 Properties of Black Oils** Definitions, Specific Gravity of a Liquid Formation Volume Factor of Oil Solution Gas-Oil Ratio Total Formation Volume Factor The Coefficient of Isothermal Compressibility of Oil Pressures Above the Bubble-Point Pressure-Pressures Below the Bubble-Point Pressure Coefficient of Viscosity of Oil Coefficient of Isobaric Thermal Expansion of a Liquid	= = =	**6**	9-10

		Interfacial Tension **Volatile Oils**			
= = =	= = =	**9 Properties of Black Oils-Field Data** Black Oil Reservoirs-Initial Reservoir Pressure Black Oil Reservoirs-Gas Production Trends Black Oil Reservoirs-Pressure Trends Fluid Properties from Production-Pressure History	= = =	**3**	10
= = =	= = =	**10 Properties of Black Oils-Reservoir Fluid Studies** Collection of Reservoir Oil Samples Reservoir Fluid Study Compositions-Flash Vaporizatio Differential Vaporization-Separator Tests- Oil Viscosity-Gas Viscosity Reservoir Fluid Properties from Reservoir Fluid Study Selection of Separator Condition Formation Volume Factor of Oil Solution Gas-Oil Ratio- Formation Volume Factor of Ga	= = =	**3**	11

		Total Formation Volume Factor-Viscosities-Coefficient of Isothermal Compressibility of O			
= = =	= = =	**11 Properties of Black Oils-Correlations** Bubble-Point Pressure Solution Gas-Oil Ratio **Density of a Liquid** Calculation of Liquid Density Using Ideal-Solution Princi-ples-Calculation of Reservoir Liquid Density at Satura- tion Pressure Using Ideal-Solution Principles-Calcula- tion of Reservoir Liquid Density at Pressures Above the **Bubble Point** Formation Volume Factor of Oil Estimation of Formation Volume Factor of Oil at Saturation Pressure Using Ideal-Solution Principles-Estimation of Formation Volume Factor of Oil at Saturation Pressure by Correlation-Estimation of Formation Volume Factor of Oil at Pressures Above the Bubble-Point Pressure	= = =	**6**	12-13

		Adjustment of Formation Volume Factor of Oil and Solution Gas- Oil Ratio for Field Derived Bubble-Point Pressure Total Formation Volume Factor The Coefficient of Isothermal Compressibility of Oil Coefficient of Isothermal Compressibility of Oil at Pressures Above Bubble-Point Pressure-Coefficient of Isothermal Compressibility at Pressures Below Bubble-Point Pressure			
= = =	= = =	**12 Gas-Liquid Equilibria** **Ideal Solutions** Raoult's Equation-Dalton's Equation Compositions and Quantities of the Equilibrium Gas and Liquid Phases of an Ideal Solution-Calculation of the Bubble-Point Pres- sure of an Ideal Liquid Solution-Calculation of the Dew- Point Pressure of an Ideal Gas Solution **Noni deal Solutions**	= = =	**3**	14

		Compositions and Quantities of the Equilibrium Gas and Liquid Phases of a Real Solution-Calculation of the Bubble-Point Pressure of a Real Liquid-Calculation of the Dew-Point Pressure of a Real Gas **Flash Vaporization** **Differential Vaporization** Calculation Procedure, Final Pressure Known-Calculation Procedure, Number of Moles to be Vaporized Known			
= = =	= = =	**16 Properties of Oilfield Water** Composition of Oilfield Waters Bubble-Point Pressure of Oilfiel Waters Formation Volume Factor of Oilfield Waters Density of Oilfield Waters Solubility of Natural Gas in Wat The Coefficient of Isothermal Compressibility of Water	= = =	**3**	15

		The Coefficient of Isothermal Compressibility of Water at Pressures Above the Bubble Poi The Coefficient of Isothermal Compressibility of Water at Pressures Below the Bubble Poi The Coefficient of Viscosity of Oilfield Waters Solubility of Water in Natural G Solubility of Water in Hydrocarb Liquid Resistivity of Oilfield Waters Interfacial Tension of Wa Hydrocarbon liquid Interfacial Tension of Water-Hydrocarbon Gas			

11. Course Evaluation

The grade is distributed out of 50 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams, reports, etc., and the second grade of 50 is for the final exam.

12. Learning and Teaching Resources

The Properties of Petroleum Fluids McCain, W. D., Penn W Publishing Co., Tulsa, 2nd Edition, 1990. ISBN 878143351	**Required textbooks (curricular books, if any)**
Other references:- 1) PVT and Phase Behaviour of Petroleum Reservoir Fluids, Ali Danesh, 3rd Edition 2003. ISBN 0444821961	**Main references (sources)**

2) Equations of State and PVT Analysis, Tarek Ahmad 2013. ISBN 0127999787 3) Phase behavior, Curtis H. Whitson, Michael R. Brulé 2000. ISBN 1555630871 4) The Properties of Gas and Liquids, Bruce E. Poling et al, 2001. ISBN 0070116822	
	Recommended books and references (scientific journals, reports...)
There are many websites available in this field	**Electronic references, Internet sites**

Course Description Form

Rock Mechanics

1. Course Name:	
Rock Mechanics	
2. Course Code:	
PE 347	
3. Semester / Year:	
Third Year, Semester I	
4. Description Preparation Date:	
14/2/2024	
5. Available Attendance Forms:	
Presence only	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 hr/semester, 2 units.	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ahmad A. Ramadhan **Email: 150073@uotechnology.edu.iq**	
8. Course Objectives	
Course Objectives	Rock Mechanics: The application of rock mechanics in drilling operations and the design of oil-related wells will be covered, as well as the role of the subject in the process of developing production in productive fields. The components of stress and strain, principal and deviant stresses and strains, the behavior of layers and rocks, theories of elasticity and inelasticity, and probabilistic analysis of stress data will be discussed. The tensile and shear strength of rocks • This course is intended for third-year students in petroleum engineering. • It aims to provide students with some concepts of the basics of rock mechanics and its applications in petroleum and drilling engineering. • It aims to provide the petroleum engineering student with the basic physical and mechanical properties of rock masses and their effects on practical applications in developing production in productive fields. • Students will be introduced to the main strength characteristics of rock masses, their failure mechanisms, and failure criteria.
9. Teaching and Learning Strategies	
Strategy	1- Focusing on understanding and interpreting objectively and using principle of brainstorming when giving lectures. 2- Homework assignments that reinforce solutions in the classroom. 3- Preparing scientific reports covering the academic subject by divid students into groups to spread the spirit of cooperation. 4- Ask thoughtful questions. 5- Focus on logical thinking and actual problem solving. 6- Use various evaluation methods, including surprise and scheduled exa and seminars by students on specific topics.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	- Identifying the nature of the academic course and the most important duties for the student, as well as preparing to receive the study materials during the semester - Identify the nature of the relationship between effort and stress -Determine the behavior of materials, especially rocks, according to the concept of stress and tension - Applying these concepts in petroleum operations, which relate to well design, drilling and production	Introduction Physical properties of rocks	-The lecture was given by the teacher -Discussions on ways to ask students motivational questions - Solve the exercises in person by the students - Delivering seminars by students and conducting discussions	-Short surprise exams - Scheduled exams - Homework reports -A scientific report on one of the relevant topics
2	**2**		Stresses and strains		
3	**2**		Thermal and hydraulic properties of rocks		
4	**2**		Deformability properties of rocks and rock masses		
5	**2**		Applications of theory of elasticity in rock mechanic		
6	**2**		Applications of theory of elasticity in rock mechanic		
7	**2**		Seismic rock properties		
8	**2**		Seismic rock properties		
9	**2**		Seismic wave propagation		
10	**2**		In situ stresses		
11	**2**		Strength properties of rock and rock masses		
12	**2**		Rock discontinuities		
13	**2**		Visco-elasticity and rocks		
14	**2**		Hemispherical projection methods		
15	**2**		Biot-Gassmann rock mode		

11.Course Evaluation

Distributing the score out of 100 as follow:
1- 15 score for quizzes, home works and scientific report.
2- 20 score for mid-course exam.
3- 65 score for final exam.

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	F**undamentals of Rock Mechanics,** Fourth Edition, J. C. Jaeger, N. G Cook, and R. W. Zimmerman, **Blackwell** Publishing Ltd, 2007, Pages 4
Main References (sources)	Petroleum Related Rock Mechanics, Second Edition, E. FJÆR, R HOLT, P. HORSRUD, A.M. RAAEN & R. RISNES, Elsevier Publish 2008, Pages 491
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Websites related to the topic

Course Description Form

1. Course Name:
Well Completion and Stimulation
2. Course Code:
PE 344
3. Semester / Year:
Third Year, Semester I
4. Description Preparation Date:
14/2/2024
5. Available Attendance Forms:
Presence only
6. Number of Credit Hours (Total) / Number of Units (Total)
45 hr/semester1, 2 units.
7. Course administrator's name (mention all, if more than one name)
Name: Muhammad Abdel Amir **Email:**
8. Course Objectives

Course Objectives	The preparation of an oil engineer, especially a production engineer, where he is able to locate the wells and complete the well in optimum state, according to the optimal production requirements, to benefit from the energy of the reservoir and the well in a good way and for the longest possible period. With it to preserve the energy of the reservoir, it also enables him to deal with the well and stimulate the well in the event of any production problem
9. Teaching and Learning Strategies	
Strategy	1- Focusing on understanding and interpreting objectively and using principle of brainstorming when giving lectures. 2- Homework assignments that reinforce solutions in the classroom. 3- Preparing scientific reports covering the academic subject by divid students into groups to spread the spirit of cooperation. 4- Ask thoughtful questions. 5- Focus on logical thinking and actual problem solving. 6- Use various evaluation methods, including surprise and scheduled exa and seminars by students on specific topics.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	Type of well – total production system and its component		-The lecture was given by the teacher -Discussions on ways to ask students	-Short surprise exams -Scheduled exams
2	**2**	Types of completion (advantage and disadvantage)			
3	**2**	Well completion for single zone, multi zones			
4	**2**	Gathering line on the surface			
5	**2**	Types of storage tanks,			

		requirement and definition		motivational questions - Solve the exercises in person by the students - Delivering seminars by students and conducting discussions	- Homework reports -A scientific report on one of the relevant topics
6	**2**	Separator definition, Separator types			
7	**2**	separation mechanism			
8	**2**	Conning definition and different methods to calculate the critical flow			
9	**2**	Choke performance and different methods to calculate the choke performance			
10	**2**	Introduction to well stimulation			
11	**2**	types of well stimulation			
12	**2**	Hydraulic fracture and its calculation (dimension of hydraulic fracture)			
13	**2**	Hydraulic fracture types			
14	**2**	Calculation of hydraulic fracture dimension			
15	**2**	exam			

11.Course Evaluation

Distributing the score out of 100 as follow:
1- 15 score for quizzes, home works and scientific report.
2- 20 score for mid-course exam.
3- 65 score for final exam.

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main References (sources)	Pressure transient testing, John Lee, John Rollins, John Spivey. SPE Textbook service, Vol. 9 Reservoir Engineering Handbook; Tarek Ahmed; Gulf publishing. Artficial-lift-methods-vol-4. Beggs-d-Production-Optimization-Using-Nodal-analysis
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Websites related to the topic

نموذج وصف المقرر

1. Course Name :
Well Log
2. Course Code:
PE 342
3. Semester / Year:
Semester1
4. Description Preparation Date:
21 March 2024
5. Available Attendance Forms:
In class attendance only
6. Number of Credit Hours (Total) / Number of Units (Total)
Theoratical (30 hrs) + Tutorial (15 hrs) / Units (2)
7. Course administrator's name (mention all, if more than one name)
Name:- Prof. Dr. **Fadhil Sarhan Kadhim** E-mail 150010@uotechnology.edu.iq
8. Course Objectives

Course Objectives	**1-** Know the fundamentals of open-hole logs.
	2- Differentiate the different types of well logs tools**.**
	3- The ability to calculate the petrophysical properties using well-log data.
	4- Application of well logs in Petroleum Engineering

9. Teaching and Learning Strategies

• Lectures: during week, the theoretical and practical lectures will be presented throughout t semester; the discussion of practical work within lab will be organized and illustrated with activities. • Assignments: after the lectures, the assignment will be explained and given to students. It is expected to be done on weekly bases. • Quizzes: the contents of each lecture will be discussed during class for open question and answer to make sure every student will participate and be active. • Practical Discussion: during practical session the students will combine together as partner and form a group to discuss their class learning and open tutorial on the topics. • In class brainstorming sessions: provide students with enough sources and background knowledge briefly within the topics during class to top up their challenge packs to be more active.	**Strategy**

10. Course Structure

Evaluation method	Learning method	Unit or subject name	Required Learning Outcomes	Hours	Week
• Daily(quizzes) and Midterm exams • Reports and homework • Commitment to th lecture time	Teaching methods according to modern and electronic methods, using only the university's approved platforms and	**A review of petro-physical properties**		**3**	1

	those available				
= = =	= = =	**Open hole well logging** **- Porosity Logs (Density Log, Sonic Log, and Neutron Log)** **- SP Log** **- Gamma Ray Log** **- Resistivity Log** **- Nuclear Magnetic Resonance (NMI** **- The Electromagnetic Propagation Tool, EPT** **- Caliper Log**	= = =	**18 hr**	2-7
= = =	= = =	**Cased Hole Logs**	= = =	**3hr**	8
= = =	= = =	**Logs While Drilling (LWD)**	= = =	**3hr**	9
		Exam		**3hr**	10

11. Course Evaluation

The grade is distributed out of 50 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly and written exams, reports, etc., and the second grade of 50 is for the final exam**.**

12. Learning and Teaching Resources

	Required textbooks (curricular books, if any)
Other references:- 1) Hilchie, D. W. (1982). Applied open-hole	**Main references (sources)**

log interpretation (for geologists and engineers), USA DW Hilchie. 2) Serra, O. (2008).Well logging handbook. Editions Technip 3) Serra, O. E. (1983). Fundamentals of well-log interpretation. Elsever 4) Bessiouni, Z. (1994). Theory, Measurement and Interpretation of Well Logs, (pp. 1-13), Texas, SPE text book series, Vol.4. 5) Kadhim F.S., and Samsuri A. (2015), Cementation Factor Relationships to Carbonate Rock Properties, Lambert Academic Publication , Germany 6) Schlumberger, (1989). Log Interpretation-Principles/Applications, Eight Printing, Sugar Land, Texas. 7) Toby, D. (2005). Well Logging and Formation Evaluation, USA, Elsevier. 8) Ellis, D. V., and Singer, J. M. (2007).Well Logging for Earth Scientists, the Netherland, 2nd Edition, Springer.	
	Recommended books and references (scientific journals, reports...)
There are many websites available in t field	**Electronic references, Internet sites**

Course Description Form

1. Course Name:
Artificial lift and well performance
2. Course Code:
PE 3411
3. Semester / Year:
Third Year, Semester 2
4. Description Preparation Date:
14/2/2024
5. Available Attendance Forms:
Presence only
6. Number of Credit Hours (Total) / Number of Units (Total)
45 hr/semester2, 2 units.
7. Course administrator's name (mention all, if more than one name)
Name: Muhammad Abdel Amir **Email:**
8. Course Objectives

Course Objectives	The preparation of an oil engineer, especially a production engineer, where he is able to deal with the different types of artificial lift methods and know how to choose suitable type for different types of production wells, also he can to calculate or test the well for different cases using test point for specific wells, to calculate the well productivity index for IPR for resent time, future time, before and after stimulation jobs, for combination IPR, and for above and below bubble point pressure using Vogel's and Standing methods

9. Teaching and Learning Strategies

Strategy	1- Focusing on understanding and interpreting objectively and using principle of brainstorming when giving lectures. 2- Homework assignments that reinforce solutions in the classroom. 3- Preparing scientific reports covering the academic subject by divid students into groups to spread the spirit of cooperation. 4- Ask thoughtful questions. 5- Focus on logical thinking and actual problem solving. 6- Use various evaluation methods, including surprise and scheduled exa and seminars by students on specific topics.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	Define the drive mechanism		-The lecture was given by the teacher -Discussions on ways to	-Short surprise exams -Schedule
2	**2**	Define the artificial lift methods and its required			
3	**2**	Calculation of gas lift valves inside the annuals.			
4	**2**	Calculation of different			

		parameters for ESP		ask students motivational questions - Solve the exercises in person by the students - Delivering seminars by students and conducting discussions	d exams - Homework reports -A scientific report on one of the relevant topics
5	**2**	Calculation of head, efficiency, and number of stages for the ESP			
6	**2**	Define the inflow performance relationship IPR			
7	**2**	Explain different types of IPR cases for below and above bubble point pressure			
8	**2**	Calculation of future and recent time IPR using different methods			
9	**2**	Define the vertical flow performance (VFP) inside the well			
10	**2**	Define and explain the working charts.			
11	**2**	Examples to use working charts			
12	**2**				
13	**2**				
14	**2**				
15	**2**	exam			

11.Course Evaluation

Distributing the score out of 100 as follow:
1- 15 score for quizzes, home works and scientific report.
2- 20 score for mid-course exam.
3- 65 score for final exam.

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main References (sources)	• Reservoir Engineering Handbook; Tarek Ahmed; Gulf publishing. • Artficial-lift-methods-vol-4. • Heriot-Watt University Production Technology II.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Websites related to the topic

Course Description Form

1. Course Name:
Drilling II
2. Course Code:
PE348
3. Semester / Year:
2nd Semester
4. Description Preparation Date:
23/3/2024
5. Available Attendance Forms:
Class Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
60 semester hours. 4 hours a week
7. Course administrator's name (mention all, if more than one name)
Name: Assist Prof. Dr. Emad Al-Khdheeawi Email: 150070@uotechnology.edu.iq
8. Course Objectives

Course Objectives	1- A comprehensive overview of the casing design and well cementing processes. 2- This course presents the primary functions of oil well casing, the various types of casing strings used, the procedures used in the design of casing strings. 3- The course also gives an overview of primary objectives of cementing, the test procedures used to determine if the cement slurry and set cement have suitable properties for meeting these objectives, 4- Study the common additives used to obtain the desirable properties under various well conditions, the techniques used to place the cement at the desired location in the well.

9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourag students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes,

	interactive tutorials, and laboratory investigations.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs	1. Select casing setting depths based on pore an fracture pressure data a well as other criteria 2. Determine casing and bit sizes 3. Apply standardized design factors to meet specific design requirements and identi the controlling design lo for each string in the we 4. Design cement slurrie using API and/or field adapted procedures and laboratory testing procedures 5. Use cement additives designing cement slurri to improve job success and/or reduce overall jo costs 6. Design cement jo to include casing, mu stage, liner, and tie-b strings	1- Casing Design overv 2- Casing Design Selection Criteria 3- Types of oil tubulars connections 4- Casing point selec and size determinat 5- Typical design facto 6- Collapse load 7- Burst load 8- Axial Load, Equivalent y strength 9- Cementing pro overview 10- Cement Properties 11- Types of Cementing 12- Oil Well Cem Additives 13- Cementing De Process 14- Primary cementing 15- Remedial cemen and Plug cementing	Explanation of scientific material and class discussio And classroom and extracurricula projects	Attendance, classes, homework, an the med exam And the end-of semester exam

1. Course Evaluation

Distribution is as follows: 15 marks for daily assignments, assignments, and attendance evaluation. 20 marks for the med exam. 65 marks for final exams.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Bourgoyne, Adam T., Keith K. Millheim, Martin E. Chenevert, and Farrile S. Young. "Applied drilling engineering." 2. Rabia, Hussain. Well engineering & construction. London: Entrac Consulting Limited.
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Drilling Mud II
2. Course Code:
PE3410
3. Semester / Year:
2nd Semester
4. Description Preparation Date:
23/3/2024
5. Available Attendance Forms:
Class Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
45 semester hours. 3 hours a week (1 hr. Theoritcal + 2 hrs. Lab)
7. Course administrator's name (mention all, if more than one name)
Name: Lect. Doaa Saleh Mahdi Email: 150082@uotechnology.edu.iq
8. Course Objectives

Course Objectives	1- Understand hydrostatic and formation pressure 2- Explains how to calculate volumes and capacities for mud tanks, pipe and annuli 3- How to monitor a trip and interpret a trip sheet. 4- Drilling Bit Nozzles Optimization

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourag students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive Lab work.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4	3 hrs 3 hrs 3 hrs 3 hrs	1- Understand hydrosta and formation pressu 2- Explains how to calculate volumes	1. Formation fluid pressure 2. Bottom Hole Pressur 3. Overbalance and	Explanation of scientific material and class discussio	Attendance, classes, homework, an the med exam

5 6 7 8 9 10 11 12 13 14 15	3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs	and capacities for mu tanks, pipe and annu 3- How to monitor a trip and interpret a trip sheet. 4- Drilling Bit Nozzles Optimization	Underbalance 4. Circulating System 5. Solid Control in Mud System 6. Pressure loss system 7. Hydraulics system 8. Bingham Plastic and power law Models 9. Mud Volumes and Pu Strokes 10. Annular capacities ar Pit Volumes 11. Trip Monitoring 12. Trip Sheet 13. Metal Displacements 14. Interpretation of trip sheets 15. Bit Nozzle Selection	And classroom and extracurricula projects	And the end-of semester exam

1. Course Evaluation

Distribution is as follows: 15 marks for daily assignments, assignments, and attendance evaluation. 15 marks for the med exam. 20 marks for Laboratory report and Exam. 50 marks for final exams.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Bourgoyne, Adam T., Keith K. Millheim, Mar E. Chenevert, and Farrile S. Young. "Applied drilling engineering." (1986). 2. Well engineering and construction", Huss Rabia..
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name: **Field Measurement & Surface Production**	
2. Course Code: **PE3413**	
3. Semester / Year: **Semester II**	
4. Description Preparation Date: **23/3/3024**	
5. Available Attendance Forms: **Attendance only**	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2hr weekly (theory + Tutorial) (30hrs/Semester) / 2 unit **2 hr weekly (30 hrs/Semester) / Lab.**	
7. Course administrator's name (mention all, if more than one name)	
Name: **Asst. Lect. Mohammed Abdullah Ahmed** Email: 150093@uotechnology.edu.iq	
8. Course Objectives	
Course Objectives	• Understand how the production system works and how the process is controlled. • Understand the fundamental principles and conce that must be taken into account when developing any type of separators or surface production facilities. • Perform Engineering Analysis. • Identify Surface production system problems.
9. Teaching and Learning Strategies	
Strategy	**1. Lectures.** **2- Discussion.** **3- Presentations and Listening.** **4- Encourage students to team working.** **5- Encouraging students to submit reports on problem and solutions related to the curriculum.**

10. Course Structure

week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2 hr**	1- To give the student the knowledge in fundamental concepts and procedures required to design, identify, and operate oil field surface production facilities. 2- To give student the knowledge of the equipment and procedures used in common separation and oil and water treatment systems 3-To give student the idea choose pipeline and pumping systems.	Introduction	1. Lectures. 2- Discussion. 3-Presentations and Listening. 4-Encourage students to team working. 5- Encouraging students to submit reports on problem and solutions related to the curriculum 6- laboratory	Quizzes Assignments Midterm lab Exam lab Exam lab Report Evaluation Final Exam
2	**2 hr**		Petroleum Production System		
3	**2 hr**		Safety Control System		
4	**2 hr**		Facility piping & Pipeline Systems		
5	**2 hr**		Separation Systems		
6	**2 hr**		Two phase separators (Horizontal separator)		
7	**2 hr**		Two phase separators (vertical separator)		
8	**2 hr**		Three phase separators (Horizontal separator)		
9	**2 hr**		Three phase separators (vertical separator)		
10	**2 hr**		Desalting Process		
11	**2 hr**		Gas sweetening facilities		
12	**2 hr**		Gas dehydration system		
13	**2 hr**		Storage Tank		
14	**2 hr**		Wet Oil treatment (part1)		
15	**2 hr**		Wet Oil treatment (part2)		

11. Course Evaluation

Final Exam 50 Marks, Final lab. (10 M), Quizzes (5 M), Assignments (5 M), lab Report

Evaluation (10M), Midterm Exam (20 M),

12. Learning and Teaching Resources

Required textbooks (curricular books, if a	- Surface production operations Volume III Facility piping and pipeline system.
Main references (sources)	- Surface Production Operations Volume_1_design_of_oil_handling.
Recommended books and references (scientific journals, reports…)	- Petroleum Production Engineering. - Larry W. Lake Petroleum Engineering Handbo Volume IV production.
Electronic References, Websites	-

Course Description Form

1. Course Name:	
Formation Evaluation	
2. Course Code:	
PE349	
3. Semester / Year:	
2nd / 2023-2024	
4. Description Preparation Date:	
10/03/2024	
5. Available Attendance Forms:	
Attendance only	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30(h/sem), 2(h/w) / 3	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Fadhil Sarhan Kadhim Email: 150010@uotechnology.edu.iq	
8. Course Objectives	
1-To estimate the porosity and permeability. **2- To detect reservoir type (lithology) and thickness.** **3-To determine clay volume from well logging data.** **4-To determine the fluid type present in the pores and saturation level.** **5-To find the prospective zones of hydrocarbon.** **6-To economically establish the existence of producible hydrocarbon reservoirs (oil and gas).** **7-Have skills to use modern software in formation evaluation information.**	• ..... • ..... • .....
9. Teaching and Learning Strategies	
Strategy	Using the following: 1- Discussion. 2- Brain storming by encouraging students to produce a large number of ideas about some issue or problem raised during the lecture. 3- Self-learning by teaching the student by his own according to his special abilities and mental and cognitive levels responding to his preferences and interests to achieve development and integration of his capabilities. 4- Cooperative learning by team working. 5- Lab and Software work with different home work.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1) An ability to distinguish, identify, define, formulate, and solve engineering problems by applying principles of engineering, science and mathematics. 2) An ability to create and carry out proper measurement and tests with quality assurance, analyze and interpret results, and utilize engineering judgment to make inferences. 3) An ability to skilfully communicate orally with a gathering of people and in writing with various managerial levels. 4) Ability to have skill and work on software's.	• Introduction on formation evaluation. • Fundamental of formation evaluation. • Estimate the porosity and permeability. • Detect reservoir type (lithology) and thickness. • Determine clay volume from well logging data. • Determine the fluid type present in the pores and saturation level. • To find the prospective zones of hydrocarbon. • To economically establish the existence of producible hydrocarbon reservoirs (oil and gas). • Have skills to use modern software in formation evaluation information.	1- Discussion. 2- Brain storming by encouraging students to produce a large number of ideas about some issue or problem raised during the lecture. 3- Self-learning 4- Cooperative learning by team working. 5-software work in the lab.	Quizzes, presentation, lab work, Midterm Exam, Final Exam

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, or Quizzes exams (5), Homework (5) , lab work (20), mid exam (20), and final exam (50).

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Richard Bateman, "Open-hole Log Analysis and Formation Evaluation", IHRDC Publishers New York. • Serra, O. (2008). Well logging handbook. Editions Technip

Main references (sources)	1. Hilchie, D. W. (1982). Applied open-hole log interpretation (for geologists and engineers), USA DW Hilchie. 2. Serra, O. E. (1983). Fundamentals of well-log interpretation. Elsevier 3. Bessiouni, Z. (1994). Theory, Measurement and Interpretation of Well Logs, Texas, SPE text book series, Vol.4. 4.Schlumberger, (1989). Log Interpretation-Principles/Applications, Eight Printing, Sugar Land,Texas. 5. Toby, D. (2005). Well Logging and Formation Evaluation, USA, Elsevier.
Recommended books and references (scientific journals, reports…)	• Kadhim F.S., and Samsuri A. (2015), Cementat Factor Relationships to Carbonate Rock Propert Lambert Academic Publication , Germany. •Pradyut B. (2012). Formation Evaluation Based Logging Data,.
Electronic References, Websites	-

Course Description Form

1. Course Name:
Safety & Hazards
2. Course Code:
PE331
3. Semester / Year:
2nd Semester
4. Description Preparation Date:
23/3/2024
5. Available Attendance Forms:
Class Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 semester hours. 2 hours a week
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Najem Abdulkadhim Al-Rubaiey Email: 100108@uotechnology.edu.iq

8. Course Objectives	
Course Objectives	1- Complete information about health and safety of employees and protection of the environment. 2- Awareness of best practices to follow at work to cause minimum pollution to the environment. 3- Knowledge of certain precautionary measures while working and handling machinery or other equipment to prevent occupational hazards. 4- The necessary information to handle waste material in a controlled manner so as to minimize negative impact to the environment. 5- The required skill and capability to dev implement and manage safety and he management systems in the organization.

9. Teaching and Learning Strategies	
Strategy	Design Thinking is part of the broader project-based learning educational moc It uses a creative, systematic approach to teach problem-solving. Stude progress through the stages of Discovery, Ideation, Experimentation, a Evolution in search of innovative solutions to vexing problems. The learn process integrates many activities: observation, collaboration, fast-learni visualization of ideas, and rapid prototyping. The integration of resear development, and evaluative activities, makes it particularly useful for courses, particularly for those with complicated, multi-faceted, and tra disciplinary topics.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 hrs		-Types of hazard	Explanation of	Attendance,
2	2 hrs		-Equipment and ene	scientific	classes,
3	2 hrs		hazard	material and	homework, an
4	2 hrs		-Fire explosion hazar	class discussio	the med exam
5	2 hrs		-Pressure, temperat	And classroom	And the end-o
6	2 hrs		and radiation hazard	and	semester exam
7	2 hrs		-Working area a	extracurricula	
8	2 hrs		height hazard	projects	
9	2 hrs		-Construction a		
10	2 hrs		maintenance hazard		
11	2 hrs		-Health, safety a		
12	2 hrs		environment and wa		
13	2 hrs		Management		
14	2 hrs		-Handling drilling fl		
15	2 hrs		products and cuttings		
			-Drilling fl		
			compatibility a		
			storage guidelines		
			-Waste managem		
			disposal		

11. Course Evaluation

Distribution is as follows: 15 marks for daily assignments, assignments, and attendance evaluation. 20 marks for the med exam. 65 marks for final exams

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	O Occupational Safety and Health Act (Osha) And Regulation, MDC Publishers SDN. BHD, 2008 Edition O Guidelines for Hazard Identification, Risk Assessment and I Control, Dosh Malaysia, 2008. O Neff, J.M., S. Mckelvie and R.C. Ayers, Jr. 2000. Environment Impacts Of Synthetic Based Drilling Fluids. Report Prepared I Mms By Robert Ayers & Associates, Inc. August 2000. U.S. Department of The Interior. O The Claremont Colleges, Environmental Health And Sa (EHS) Handbook For Employees, The Claremont Coll Services Environmental Health And Safety 2021-2022 Acade Year (Revised 1/6/2021)
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Numerical analysis
2. Course Code:
PE332
3. Semester / Year:
2nd Semester
4. Description Preparation Date:
23/3/2024
5. Available Attendance Forms:
Class Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
30 semester hours. 2 hours a week
7. Course administrator's name (mention all, if more than one name)
Name: Lect. Doaa Saleh Mahdi Email: 150082@uotechnology.edu.iq
8. Course Objectives

Course Objectives	1- Use of numerical methods in a variety of engineering problems. 2- Basic methods of numerical analysis and the numerical approximation 3- Use mathematical techniques which are required to approximate the solution of single nonlinear equations and integrals. 4- Numerical solution of differential equations. 5- Introduction to the principle of numerical simulation methods

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourag students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	2 hrs 2 hrs 2 hrs 2 hrs 2 hrs 2 hrs 2 hrs 2 hrs 2 hrs 2 hrs 2 hrs 2 hrs 2 hrs 2 hrs 2 hrs	1- Understand k mathematical techniques in numerical analysis 2- Identify and apply appropriate mathematical techniques to approximate functio 3- Perform erro analysis to select an appropriate numeric model and to estimat errors in numerical solution of a given problem. 4- Derive a varie of numerical algorithms/methods 5- Compare the viability of different approaches to the numerical solutions various mathematica problems arising in roots of linear and n linear equations, interpolation and approximation, numerical differentiation and integration, and differential equation 6- Analyze evaluate the accur of common numeri methods.	1. -Introduction to Numerical Analysis 2. Analytical and Numer methods 3. Ordinary Differential Equations 4. Numerical solution of differential equations 5. Conversion of a high order ODE to a syste first order ODEs. 6. Conversion of a syste of high order ODEs to system of first order ODEs. 7. Runge-Kutta Methods 8. Solution of Systems o Linear Equation and Numerical Methods 9. Numerical Methods f Matrix and Solution Boundary Value Problems 10. Least Squares Curve Fitting 11. Interpolation 12. Inverse Interpolation 13. Numerical Differentiation 14. Extrapolation 15. Numerical Integratio	Explanation of scientific material and class discussio and classroom and extracurricula projects	Attendance, classes, homework, an the med exam And the end-o semester exam
16. Course Evaluation					
Distribution is as follows: 15 marks for daily assignments, assignments, and attendance evaluation. 20 marks for the med exam. 65 marks for final exams					
17. Learning and Teaching Resources					

Required textbooks (curricular books, if any)	1. Numerical Methods for Engineers", Steven C. Chapra and Raymond P. Canale. 2. W. Cheney and Kincaid, Numeri Mathematics and Computing, 2002
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Gas and Oil Transportation
2. Course Code:
PE3412
3. Semester / Year:
Semester
4. Description Preparation Date:
21−3−2024
5. Available Attendance Forms:
Attendance only
6. Number of Credit Hours (Total) / Number of Units (Total)
2hr weekly (30hrs/sem) / 2 unit
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Ramzy. Syhood. Hamied Email: ramzy.s.hamied@uotechnology.edu.iq
8. Course Objectives

Course Objectives	**1- To give the student the knowledge in pipeline, horizontal and non-horizontal flow calculation as single and two-phase flow.** **2- To give student the knowledge of sizing and specifying pipe, selection of route, protection against corrosion pipe lying. Types of oil and gas transportations.** **3- To give student the idea about tanks, pressure vessels, design and selection of storage tanks**

9. Teaching and Learning Strategies

Strategy	**1. Lectures.** **2- Discussion.** **3- Presentations and Listening.** **4- Encourage students to team working.** **5- Encouraging students to submit reports on problem and solutions related to the curriculum.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	**1- To give the student the knowledge in pipeline, horizontal and non-horizontal flow calculation as single and two-phase flow.** **2- To give student the knowledge of sizing and specifying pipe, selection of route, protection against corrosion pipe lying. Types of oil and gas transportations.** **3- To give student the idea about tanks, pressure vessels, design and selection of storage tanks.**	**1- Methods of Oil and Gas Transportation (single flow calculations)** **2- Pipeline Transportation of single and Multi-phase Flow** **3- Efficiency of Pipeline Transportation with other types** **4- Multi-phase Flow** **5- Horizontal and Non-Horizontal Flow Calculation multi-phase flow** **6-Gas Flow in Series, Parallel and Network Pipelines** **7-Gathering pipelines. The SCADA System for pipelines.** **8-Pipelines Economics, Pipelines Design, Pipeline networks** **9-Sampling and Testing of Oil and Gas** **10-Pumps and Compressors** **11-Instrumentation and Control, Safety and Supervision.** **12-Rules and Regulation in Transportation and Storage of Oil and Gas** **13-Economic pipe diameter** **14-Types of Storage** **15-Underground Storage of Natural Gas**	**1. Lectures.** **2- Discussion.** **3-Presentations and Listening.** **4- Encourage students to team working.** **5- Encouraging students to submit reports on problem and solutions related to the curriculum**	**Quizzes** **Assignments** **Projects / Report** **Midterm Exam** **Final Exam**

11. Course Evaluation

Final Exam 65 Marks, Quizzes (5 M), Assignments (7.5 M), Report (7.5 M), Midterm Exam (15 M)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**1- "Oil and Gas Production Handbook", Havard Devold., Wikipedia (The Free Encyclopedia), 2013.**
Main references (sources)	**2- "Production and Transportation of Oil and Gas B: Gathering and Transportation (Development in Petroleum Science)", A. P.**

	Szilas, Elsevier Science Publishing Company 1986.
Recommended books and references (scientific journals, reports…)	**3- "Gas Conditioning and Processing: The Basic Principles", John. M. C., Robert. A. H., Robert. N. M., Copyright Campbell Petroleum Series USA. 1992.**
Electronic References, Websites	https://zlibrary-asia.se/ https://www.researchgate.net/

Course Description Form

1. Course Name:
Petroleum Reservoir Engineering
2. Course Code:
PE 441
3. Semester / Year:
1st Semester / 2023-2024
4. Description Preparation Date:
21/3/2024
5. Available Attendance Forms:
Class Attendance + online if its importand
6. Number of Credit Hours (Total) / Number of Units (Total)
60 semester hours. 45 class (TH) + 15 Class (Tu.)
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Ghazwan Noori Saad Jreou Email: Ghazwan.jreou@uokufa.edu.iq
8. Course Objectives

Course Objectives	The objective of this course are: - • Students will be able to estimate reserves using both volumetric and MBE equation. • Students will be familiar with Darcy law, understand drive mechanisms, understand the concept of enhanced oil/gas recovery and interpret basic well pressure and production test results • The student able to familiar with reservoir reports, studies and maps to be familiar with the productivity and history of the reservoir for all parameters recorded over time for the purpose of choosing the method applicable to the case of the reservoir.

	• The student is able to treat the terms included in the MBE equations according to the consider case, according to the linearization MBE technique. • The student should be able to deal with modern software related to reservoir engineering and apply the equation MBE like MBAL.

9. Teaching and Learning Strategies

Strategy	• Lectures: during week, the theoretical and practical lectures will be presented throughout the semester; the discussion of practical work will be organized and illustrated with activities. • Assignments: after the lectures, the assignment will be explained and given to students. It is expected to be done on weekly bases. • Quizzes: the contents of each lecture will be discussed during class for open question and answer to make sure every student wi participate and be active. • Practical Discussion: during practical session the students will combine together as partners and form a group to discuss their class learning and open tutorial on the topics. • In class brainstorming sessions: provide students with enough sources and background knowledge briefly within the topics dur class to top up their challenge packs to be more active.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1.	3	**1 To recall and describe, the main terminology, concepts and techniques that applies to reservoir engineering.** **2 Analyze and evaluate approaches and strategies for the assessment and quantification of reservoir uncertainty and data**	Introduction Reservoir Rock properties and Darcy's law Reservoir Fluid Properties	Lectures are supported by solved examples, problem-solving tutorials, homework a real case studies. Students will have the opportunity to use a commercial software packag	• Frequently (quizzes) and Midterm exams • Reports and homework • Commitment to the lecture time

		management. **3 Apply a critical-thinking and problem-solving approach towards the main principles of reservoir engineering.** **4 Apply theoretical and practice skills in data analysis used for real reservoirs through case studies.** **5 Recommend reservoir production and development plan** **6 Describe characterization of rock/formation properties and fluids** **7 Describe fluid flow and mass balance in the reservoir** **8 Analyze, and devise relevant solutions to reservoir engineering problems posed within the course individually and with team mates.** **9 Employ, analyses and optimize a material balance /water influx exercise by using a commercial software that is commonly used in the industry.** **10 Interact with other students to practice working in a petroleum engineering team and**			

		communication skills.			
2.	3		Review published PVT correlations	== == ==	== == ==
3.	3		Reservoir maps and Volumetric Fluid pressure regimes, IOIP	== == ==	== == ==
4.	3		Material balance Principals, derivations and cases	== == ==	== == ==
5.	3		Material balance Linearization's and drive mechanisms	== == ==	== == ==
6.	3		Under saturated reservoir Characterization, MBE applications	== == ==	== == ==
7.	3		Under saturated reservoir Field Cases, drive mechanisms and future predictions	== == ==	== == ==
8.	3		Saturated reservoir Characterization, MBE applications	== == ==	== == ==
9.	3		Saturated reservoir Field Cases, drive mechanisms and future predictions	== == ==	== == ==
10.	2		MID Exam	== == ==	== == ==

11.	3		Water influx Introduction, characterizations, mathematical modeling	== == ==	== == ==
12.	3		Water influx Van everding method Fetkifitch method	== == ==	== == ==
13.	3		Water influx Carter Tracy method, horizontal well	== == ==	== == ==
14-15	3		Applications with MBAL software + Drive mechani implementation factors with reservoir case studies	== == ==	== == ==

1. Course Evaluation

The grade is distributed out of 50 according to the tasks assigned to the student, such as daily activities, daily, oral, monthly and written exams, reports, etc., and the second grade of 50 is for the final exam.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1) Applied Petroleum Reservoir Engineering by B.C Craft and M.Hawkins, Prentic Hall publisher, ISBN-13: 978-0-13-315558-7 ISBN-10: 0-13-315558-7
Main references (sources)	1) fundamentals of reservoir engineering, by LP. DAKE ISBN 0-444-41830-X 1978 ELSEVIER SCIENCE B.V. All rights reserved. 2) Reservoir Engineering Handbook by Tarek Ahmed Fifth Edition, Gulf Professional Publishing 2019 ISBN: 978-0-12-813649-2
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	There are many websites available in this field

Course Description Form

1. Course Name:	
Drilling Engineering	
2. Course Code:	
PE442	
3. Semester / Year:	
1st Semester	
4. Description Preparation Date:	
23/3/2024	
5. Available Attendance Forms:	
Class Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 semester hours. 4 hours a week	
7. Course administrator's name (mention all, if more than one name)	
Name: Assist Prof. Dr. Emad Al-Khdheeawi Email: 150070@uotechnology.edu.iq	
8. Course Objectives	
Course Objectives	1- Understand the impact of a well control events 2- Understand the need for well control assessment. 3- Different Mathematical Formulas for well

	control 4- Understand why controlling pressure in the well is important

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourag students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, a interactive tutorials.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs 4 hrs	1. Understanding of Well Control Principles: Upon completion of the course students will demonstrat solid understanding of th fundamental principles o well control, including pressure management an fluid balance. 2. Knowledge of Well Contr Equipment: Students wil able to identify, describe and explain the functions various well control equipment, including blowout preventers (BO	1- Overview of v control events 2- Wellbore pressure 3- Wellbore barriers 4- Kick tolerance 5- Causes of kicks; K 6- warning signs indicators 7- Shut-in procedure 8- Formation integ test 9- Influx characteris and behaviour 10- Well control meth 11- Annular pressures 12- Common well con	Explanation of scientific materia and class discussions And classroom an extracurricular projects	Attendance, class homework, and th med exam And the end-of-semester exam.

		choke manifolds, and saf devices. 3. Safety Awareness: Stude will have an increased awareness of safety protocols and procedure well control operations, emphasizing the importance of safety in t oil and gas industry. 4. Hydrostatic Pressure and Pressure Calculations: Students will be proficie in calculating hydrostati pressure, pressure gradients, and related w control calculations, allowing them to assess manage pressure effecti during drilling and production. 5. Problem-Solving and Decision-Making: Studen will acquire problem-solving skills and the abi to make informed decisi when faced with well control challenges, contributing to the safety and efficiency of operati 6. Critical Thinking and Ris Assessment: Students of course will be able to thi	problems 13- Well con management 14- Fracture press and maxim surface pressure 15- Formation p pressure		

		critically, assess risks, an make informed judgmen to prevent well control incidents and respond effectively if they occur.			

3. Course Evaluation

Distribution is as follows: 15 marks for daily assignments, assignments, and attendance evaluation. 20 marks for the med exam. 65 marks for final exams.

4. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Rabia, Hussain. Surface well control. London: Entrac petroleum Limited,.
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Engineering Project	
2. Course Code:	
432 – 433	
3. Semester / Year:	
Yearly	
4. Description Preparation Date:	
23/3/2024	
5. Available Attendance Forms:	
Class Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 Yearly hours. 2 hours a week	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Najem Abdulkadhim Al-Rubaiey, Prof. Dr. Fadhil Sarhan Kadhim, Prof. Dr. Ramzi Sayhod Hamid, Dr. Mausysd Mohamed Hassan Email: 100108@uotechnology.edu.iq	
8. Course Objectives	
Course Objectives	1. Demonstrate a sound technical knowledge their selected project topic. 2. Undertake problem identification, formulat and solution. 3.Design engineering solutions to comp problems utilizing a systems approach. 4. Demonstrate the knowledge, skills and attitu

	of a professional engineer.

9. Teaching and Learning Strategies

Strategy	Design Thinking is part of the broader project-based learning educational model. It u a creative, systematic approach to teach problem-solving. Students progress through stages of Discovery, Ideation, Experimentation, and Evolution in search of innovat solutions to vexing problems. The learning process integrates many activit observation, collaboration, fast-learning, visualization of ideas, and rapid prototyp The integration of research, development, and evaluative activities, makes it particula useful for all courses, particularly for those with complicated, multi-faceted, and tra disciplinary topics.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2 3-4 5-6 7-8 9-10 11-12 13-14 15-16 17-18 19-20 21-22 23-24 25-26 27-28 29-30	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		**Introduction** **Literature Review** **Planning and Introduction** **Writing Practice** **Methodology** **formatting Report** **Presentation** **Experimental Design** **Analyzing your Experiment Results** **Writing Results and Discussion** **Tips on English Writing** **Tips on Project presentation** **Tips on Demonstration** **Tips on Plagiarism**	Explanation scientific material and class Seminars discussions And classroo and extracurricu projects	Attendance, classes, Seminars trair homework, an the med exam And the end-o Seminar exam

11. Course Evaluation

Distribution is as follows: 400 marks for daily assignments, assignments, and attendance

evaluation.. 60 marks for final seminar exams

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	FINAL YEAR PROJECT GUIDELINES FOR SUPERVISORS A STUDENTS, UNIVERSITI TEKNOLOGI PETRONAS, Bandar Seri Iskan 31750 Tronoh, Perak Darul Ridzuan. Doc. Ref. No. : UTP-ACA-PF FYP-01, Issue Version : 5.0, Date : Jan 2014.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Well testing	
2. Course Code:	
PE444	
3. Semester / Year:	
1st Semester – 2023/2024	
4. Description Preparation Date:	
24−3−2024	
5. Available Attendance Forms:	
Class attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hrs weekly / 45 hrs	
7. Course administrator's name (mention all, if more than one name)	
Name: Salam Al-Rbeawi Email: salam@metu.edu.tr	
8. Course Objectives	
1. be successful practitioners of petroleum and natural gas engineering who can self-learn, develop, apply, and advance technical knowledge for engineering problem-solving and design purposes. 2. demonstrate technical competence and necessary soft skills to advance in their careers, and assume leadership roles. 3. perform engineering duties with strong professionalism, ethical behavior, and	• ..... • ..... • .....

economic and social awareness.	

9. Teaching and Learning Strategies

Strategy	Four-hour lecture per week divided into two sessions of 2.0 hrs. The first session focuses on the theoretical descriptions and the second includes the tutorial part. The first session starts with a short review of what has been taken in the previous week, deep insights into the assigned topic for the week of interest, and end with a short summary of what will be covered next week. In the second session, the students are asked to analyze pressure records (taken from the literature) and interpret the reservoir parameters. Assignments are handed out to students on a bi-weekly base.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	(1) Understand the basics of fluid flow in porous media, the applicability of diffusivity equations in these media, and the solution of these equations.	- Personal Introduction - Review of syllabus - Types of well tests Diffusivity equation and solutions	Extensive of Micro tools such Word Excel required. Since mos the topics included l and complicate mathemati models, powerful	**Quizzes Assignment Projects / Report Midterm Ex Final Exam**
2	3		- Pressure drawdown test - Pressure analysis using conventional		

		Differentiate between different types of well tests and the conditions and function of each type. (2) Analyze pressure drawdown tests and characterize reservoirs using conventional well test analysis techniques. Understand the impact of skin factor and wellbore storage on pressure behavior and the ways to estimate this impact from pressure records for all wellbore types. (3) Analyze reservoir limit	techniques. Wellbore storage effect and s factor.	computatio tools needed only for hand-out also in exams.	
3	3		- Pressure drawdown test. Pressure analysis using pressure derivative.		
4	3		- Reservoir limit test - Pressure analysis using conventional techniques. Pressure analysis using pressure derivative.		
5	3		- Pressure buildup test - Pressure analysis using conventional techniques. - Horner plot, MDH plot Shutt-in Equivalent time		
6	3		- Pressure buildup test Pressure analysis using pressure derivative.		
7	3		- Pressure buildup test-Average reservoir pressure - MBH method - Dietz method		

		tests to estimate drainage area, initial oil in place, reservoir boundaries, and the shape of the drainage area. (4) Analyze pressure build-up tests and characterize reservoirs using conventional well test analysis techniques. Estimate average reservoir pressure using pressure build-up tests (5) Apply the type-curve matching technique as one of the reservoir characterizati on tools for	- Ramey-Cobb method MDH method		
8	3		**Mid-term exam**		
9	3		Type-curve matching techniq		
10	3		- Modern well test analysis. - Pressure derivative concept. TDS.		
11	3		- Well test analysis of closed reservoirs. Average reservoir pressure f drawdown test.		
12	3		- Well test analysis of closed reservoirs. Average reservoir pressure f drawdown test.		
13	3		- Well test analysis in reservoir depleted by horizontal wells. - Flow regimes. - Conventional analysis. Modern well test anal (Pressure derivative).		

14	3	the pressure drawdown test to predict the reservoir parameters. (6) Analyze pressure records of (drawdown, and build-up) using modern well test analysis techniques (TDS) for the characterization of finite and infinite (closed) reservoirs. (7) Interpret the pressure behavior of reservoirs depleted by horizontal wells. Understand the impact of flow regimes on pressure behaviors. Estimate the horizontal and vertical	- Well test analysis in reservoir depleted by horizontal wells. - Flow regimes. - Conventional analysis. Modern well test anal (Pressure derivative).		
15	3		Well test design.		

		permeabilities from and the anisotropy. (8) Design and implement well tests and estimate pretest reservoir parameters and test duration for different reservoirs. Calculate flow rate requirement for constant rate test.			

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

(20 mid exam - 65 final exam - 10 presentations and reports - 5 quizzes)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1- **Pressure Transient Testing, John Lee, John Rollins, John Spivy, 2003, SPE Textbooks, USA.** 2- **Petroleum Production Engineering: A computer Assisted Approach; Boyun Guo, Willian Lyons, Ali Ghalambor; Elsevier**

	Science & Technology 3- **Reservoir Engineering Handbook; Tarek Ahmed; Gulf publishing.** **Production Operation Engineering; Petrole Engineering Handbook; Volume IV; La Larry W. and Clegg, Joe Dunn; SPE; 2007.**
Main references (sources)	**Pressure Transient Testing, John Lee, J Rollins, John Spivy, 2003, SPE Textbooks, US**
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Reservoir Management (i)	
2. Course Code:	
PE445	
3. Semester / Year:	
Fourth Year/ Second Semester	
4. Description Preparation Date:	
5. Available Attendance Forms:	
Presence only	
6. Number of Credit Hours (Total) / Number of Units (Total)	
45hr/ Semester, 2 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Fadhil S. Khadhim, Asst. Lect. Jassim M. Al Said Naji, Asst. Lect. Mohammed A. Ahmed Email: 150010@uotechnology.edu.iq	
8. Course Objectives	
Course Objectives	**1- Use appropriate approaches in integrated field development and management.** **2- Be familiar with the appropriate data collection, analysis, validation and integration process.** **3- Illustrate the points of integration between the different disciplines, (geoscience, engineering, etc.) during the applications of the reservoir management concepts and applications.**

	4- Use the Interdisciplinary Synergistic approach to efficient reservoir management. **5- Include each reservoir management component and the importance of timing and cost/benefit analysis.** **6- Apply the different methods of reservoir performance analysis and forecast, and Up-to-date knowledge on the improved recovery processes.**

9. Teaching and Learning Strategies

Strategy	1- Give emphasis on conceptual understanding. 2- Set challenging homework that expands on what you learned in class. 3- Cooperative learning techniques should be used. 4- Ask thoughtful questions. 5- Concentrate on logical thinking and actual problem-solving. 6- Use a variety of assessment methods. 7- Weekly presenting practical work by students' groups.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
15 weeks	**45 hr**	**1- Developing and strengthening students' problem-solving skills.** **2- Teaching them to present and solve practical problem in term of groups.** **3- Learning how to use petroleum software in making models.** **4- Learning how to deal with real data.**	Reservoir Management I 3 units	**1- Explaining the study material by in term of PPT.** **2- Assigning students to work on field data and create models as homework** **3- Presenting the work in PowerPoint format by the students and discussing it in the classroom.**	**1- Quizzes** **2- Reports** **3- Presentations** **4- Half course Exams** **5- Home works.** **6- Final Exam.**

11. Course Evaluation	
Distributing the score out of 100 as follow: 1- 15 score for quizzes and home works. 2- 15 score practical works 2- 20 score for mid-course exam. 3- 50 score for final exam.	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	Wiggins, M.L., ed: A Manual for petroleum Reservoir Management, Crisman Institute for petroleum reservoir management, department of petroleum engineering, Texas A& MU, College Station, TX (1989).
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Optimization	
2. Course Code:	
PE431	
3. Semester / Year:	
1st Semester – 2023/2024	
4. Description Preparation Date:	
24−3−2024	
5. Available Attendance Forms:	
Class attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hrs weekly / 45 hrs	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Jihad Husain Al-Joumaa Email: 150078@uotechnology.edu.iq	
8. Course Objectives	
1- Teach student to seek solution to an objective (minimization maximization of an analysis feature parameter) while being constrained b set of rules specified in the form of allowable ranges for model dimensi and other analysis feature parameters. 2- an effective approach to achieve a “best” solution to a cer problem 3- Develop the analytical sense of students	• ..... • ..... • .....

9. Teaching and Learning Strategies

Strategy	1- Discussion. 2- Brain storming by encouraging students to produce a large number of ideas about some issue or problem raised during the lecture. 3- Self-learning by teaching the student by his own according to his special abilities and mental and cognitive levels responding to his preferences and interests to achieve development and integration of his capabilities. 4- Cooperative learning by team working.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	6	1) An ability to distinguish, identify, define, formulate, and solve engineering problems by applying principles of engineering, science and mathematics. 3) An ability to create and carry out proper measurement and tests with quality assurance,	Introduction Optimization	1- Discussion. 2- Brain storming by encouraging students to produce a large number of ideas about some issue or problem raised during the lecture. 3- Self-learning 4- Coopera learning by te working	Quizzes, Assignments, Report ,presentations Midterm Exam, and Final Exam
3-5	9		Optimization Methods Sin Variable, Analyt Methods, Numer Methods, Graph Methods.		
6-7	6		Multivariable Optimization Methods, Analyt Methods, Numer Methods		
8-9	6		Numerical Search		

10-11	6	analyze and interpret results, and utilize engineering judgment to make inferences. 4) An ability to skilfu communicate orally with a gathering of people and in writin with various managerial levels.	Linear programmi graphical method		
12-13	6		Simplex method		
14-15	6		Modern Method Optimization.		

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

(20 mid exam - 65 final exam - 10 presentations and reports - 5 quizzes)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Modelling and Optimization of Oil and Gas Produc Systems, J.D. Jansen and P.K. Currie, Version 5c, Ma 2004
Main references (sources)	Modelling and Optimization of Oil and Gas Produc Systems, J.D. Jansen and P.K. Currie, Version 5c, Ma 2004
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Reservoir Simulation	
2. Course Code:	
PE446	
3. Semester / Year:	
Semester I	
4. Description Preparation Date:	
23/3/2024	
5. Available Attendance Forms:	
Attendance only	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4hr weekly (theory + Tutorial) (60hrs/Semester) / 3 unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Asst. Lect. Mohammed Abdullah Ahmed Email: 150093@uotechnology.edu.iq	
8. Course Objectives	
Course Objectives	Explain the mathematical and computational concepts behind commer reservoir simulators Explain the physical laws that govern fluid flow in porous media Formulate single-phase flow in petroleum reservoirs Solve the governing partial differential equations using finite differe methods and interpret the potential numerical errors

9. Teaching and Learning Strategies	
Strategy	1. Lectures. 2- Discussion. 3- Presentations and Listening. 4- Encourage students to team working. 5- Encouraging students to submit reports on problem and solutions rela to the curriculum.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4 hr	1- To give the student t knowledge in the theoretical basis and practical fundamentals for the mathematical modelling and numeric simulation of fluid flow petroleum reservoirs.	Introduction: Mileston for the engineering approach-Importance the engineering and mathematical approac	1. Lectures.	Quizzes
2	4 hr		Review of The governi laws and equations required for the modelling of single-pha flow in porous media,	2- Discussion.	

			such as mass conservation, Darcy, equation of state, rock compressibility, capilla pressure and relative permeability.	3-Presentation and Listening.	Assignmen ts
3	4 hr	2- To give student the knowledge of The laws and equations required for the modelling of single-phase	Single-phase fluid equations in multidimensional domain, Derivation of diffusivit equation (By combinin these laws and equatio withe corresponding partial differential equations)	4-Encourage students to tea working.	
4	4 hr		Reservoir discretizatio Basic engineering concepts, multidimensional flow Cartesian coordinates- Multidimensional flow radial-cylindrical coordinates		Midterm
5	4 hr		Solution of D.E by the numerical methods for solving the governing partial differential equations under differ types of gridding. (bloc centered grids, point		

		3-To give the student knowledge about partia differential equations a the finite difference methods.	distributed grids)	5- Encouraging students to submit reports on problem an solutions relate to the curriculu	Final Exam
6	4 hr		A particular attention i given to the internal ar external boundary conditions, and initial conditions.		
7	4 hr		Demonstrating how numerical simulation c help us to forecast the reservoir performance response to different conditions.		
8	4 hr		Well representation in simulators		
9	4 hr		Linearization of flow equation: Introduction Nonlinear terms in flov equations-		
10	4 hr		Nonlinearity of flow equations for various fluids-		
11	4 hr		Linearization of nonlinear terms- Linearized flow equations in time (part		
12	4 hr		Linearization of nonlinear terms- Linearized flow equations in time (part		
13	4 hr		Methods of solution of linear equations (part		

14	4 hr		Methods of solution of linear equations (part2		
15	4 hr		Direct solution method Iterative solution methods.		

11. Course Evaluation
Final Exam 65 Marks, Quizzes (10 M), Assignments (5 M), Midterm Exam (20 M),

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	Basic applied reservoir simulation, by Turgay Ertekin, J.H. Abou-Kassem and G.R. King
Recommended books and references (scientific journals, reports…)	Principles of Applied Reservoir Simulation, 3rd Editio John R. Fanci
Electronic References, Websites	

Course Description Form

1. Course Name:	
Risk Analysis	
2. Course Code:	
PE . 447	
3. Semester / Year:	
Fourth Year, Semester I	
4. Description Preparation Date:	
14/2/2024	
5. Available Attendance Forms:	
Presence only	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 hr/semester, 2 units.	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ahmad A. Ramadhan **Email: 150073@uotechnology.edu.iq**	
8. Course Objectives	
Course Objectives	The economic structure of the petroleum industry differs strongly from other industries due to the great risks and uncertainty associated with oil and gas projects, coupled with dangerously volatile price levels. Therefore, this module provides students' knowledge and related sciences in the oil economy and its impact on the economic life of Iraq and the countries of the world, also international strategy of energy, types of interest, future production of oil and gas evaluation, time value of money, method of engineering decisions.
9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to Encourage students to ask and answer questions, as well as solve many examples to increase students' knowledge and also to introduce the student to the most important petroleum

	companies and help them understand the power of petroleum economic on our daily life.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	- Identifying the nature of the academic course and the most important duties for the student, as well as preparing to receive the study materials during the semester - Identify the nature of the relationship between effort and stress -Determine the behavior of materials, especially rocks, according to the concept of stress and tension - Applying these concepts in petroleum operations, which relate to well design, drilling and production	Introduction to the life cycle of a petroleum project	-The lecture was given by the teacher -Discussions on ways to ask students motivational questions - Solve the exercises in person by the students - Delivering seminars by students and conducting discussions	-Short surprise exams -Scheduled exams - Homework reports -A scientific report on one of the relevant topics
2	**2**		Contract Types of Petroleum Exploration and Production		
3	**2**		Investment Decisions		
4	**2**		**Evaluation of petroleum projects** - The net cash flow		
5	**2**		Types of cost in petroleum proje		
6	**2**		**Evaluation of petroleum projects** - Discounted cash flow - Net present value - Internal rate of return - Payback period		
7	**2**		Petroleum companies and economics		
8	**2**		**Types of Interests:** -Simple and compound interest		
9	**2**		**Types of Interests:** -Continuous Interest		
10	**2**		Risk in petroleum economics		
11	**2**		Risk of Reserve Estimation in Petroleum Engineering		
12	**2**		**Reserves Estimations** -Analog Method		
13	**2**		**Reserves Estimations** -Volumetric Method		
14	**2**		**Reserves Estimations**		

			-Material Balance Method		
15	**2**		Material Balance Equation, straight-line concept		

11. Course Evaluation

Distributing the score out of 100 as follow:
1- 15 score for quizzes, home works and scientific report.
2- 20 score for mid-course exam.
3- 65 score for final exam.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Abdel-Aal, H. & Alsahlawi, M. (2014). Petroleum economics & engineering, ed. USA: Taylor & Francis Group, LLC.
Main References (sources)	1.Al-Attar, A. & Alomair, O. (2005). Evaluation of upstream petroleum agreements and exploration and production costs, OPEC Review, vol. 29, issue 4, pp. 243-266. 2.Babusiaux, D. & Pierru, A. (2005). Corporate investment & economic analysis: Exercises & case study, France: Editions Technip. 3.Babusiaux, D., Barreau, S. & et al. (2004). Oil and gas exploration and production reserves, costs, contracts. France: Editions Technip. 4.Belli, P., Anderson, J., et al. (1998). Handbook on economic analysis of investment operating, 5.USA: Operational Core Services Network Learning and Leadership Center of the World Bank. 6.Inkpen, A. & Moffett, M. H. (2011). The global oil and gas industry management, strategy & finance, USA: PennWell Publishing. 7.Mian, M.A. (2011). Project Economics and decision analysis Volum Deterministic models, edition 2. Tulsa, Oklahoma: PennWell.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Websites related to the topic

Course Description Form

1. Course Name:
Directional Drilling
2. Course Code:
PE448
3. Semester / Year:
2nd Semester
4. Description Preparation Date:
23/3/2024
5. Available Attendance Forms:
Class Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
75 semester hours. 5 hours a week (3 hr. Theoritcal + 2 hrs. Lab)
7. Course administrator's name (mention all, if more than one name)
Name: Assist Prof. Dr. Emad Al-Khdheeawi Email: 150070@uotechnology.edu.iq
8. Course Objectives

Course Objectives	1- Provide a knowledge and skills necessary for directional and horizontal well design. 2- The course also enables students to understand the operations carried out by directional drilling. 3- Students will also learn how to contribute to the design of directional and horizontal wells. 4- The course will cover the fundamentals, design considerations, and operational aspects of directional and horizontal drilling.

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encoura students' participation in the exercises, while at the same time refining a expanding their critical thinking skills. This will be achieved through class interactive Lab work.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3	5 hrs 5 hrs 5 hrs	1. Design the directional we trajectory	1. Uses of directiona drilling	Explanation of scientific materia and class	Attendance, classe homework, and th med exam

4 5 6 7 8 9 10 11 12 13 14 15	5 hrs 5 hrs 5 hrs 5 hrs 5 hrs 5 hrs 5 hrs 5 hrs 5 hrs 5 hrs 5 hrs 5 hrs	2. Compare different directional well design w regard to technical limitations of drilling equipment 3. Compare the different telemetry systems used i directional drilling 4. Plan completion design f the directional well	2. Types of direction well 3. Dog leg severity 4. Survey calculatior 5. Tangential metho 6. Average angle method 7. Balanced tangenti method 8. Radius of curvatu method 9. Minimum of curvature method 10. Design of the directional 11. Design of horizont well trajectory 12. Planning direction wells 13. Survey instrumen 14. Horizontal, Multilateral Drilli 15. Methods of deflec a well bore	discussions And classroom ar extracurricular projects	And the end-of-semester exam.

1. Course Evaluation

Distribution is as follows: 15 marks for daily assignments, assignments, and attendance evaluation. 15 marks for the med exam. 20 marks for Laboratory report and Exam. 50 marks for final exams.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Richard S. Carden "Horizontal and Directional Drilling." 2. J. A. Short "Introduction to Directional and Horizo Drilling."
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Well monitoring and workover
2. Course Code:
PE4410
3. Semester / Year:
2nd Semester – 2023/2024
4. Description Preparation Date:
24−3−2024
5. Available Attendance Forms:
Class attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
3 hrs weekly / 45 hrs
7. Course administrator's name (mention all, if more than one name)
Name: Salam Al-Rbeawi Email: salam@metu.edu.tr
8. Course Objectives

1. be successful practitioners of petroleum and natural gas engineering who can self-learn, develop, apply, and advance technical knowledge for engineering problem-solving and design purposes. 2. demonstrate technical competence and necessary soft skills to advance in their careers, and assume leadership roles. 3. perform engineering duties with strong professionalism, ethical behavior, and economic and social awareness.	• ….. • ….. • …..

9. Teaching and Learning Strategies	
Strategy	Four-hour lecture per week divided into two sessions of 2.0 hrs. The first session focuses on the theoretical descriptions and the second includes the tutorial part. The first session starts with a short review of what has been taken in the previous week, deep insights into the assigned topic for the week of interest, and end with a short summary of what will be covered next week. In the second session, the students are asked to solve several problems and design different workover operations. Assignments are handed out to students on a bi-weekly base

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	(1) Understand the principles	- Personal Introduction	Extensive of Micro	**Quizzes Assignments**

		of the workover operations, procedures, and types of well intervention. The conventional and non-conventional workover operations. The workover rigs for land operations and sloid deposit clean-up operations and mechanisms. (2) Differentiate between different types of completion technologies. Open hole completion, cased cemented and perforated holes, and gravel-packed completion. Calculate the pressure drop caused by the completion systems. (3) Differentiate between different types of formation damage and the mechanisms of formation damage. Skin factor and pseudo-skin factor. The calculations of all types of regular skin factors and pseudo-skin factors. The relationships between skin factor and reservoir	- Review of syllabus - Types of work over operations The conventional and n conventional workover	tools such Word and E is requi Since most the topics included and complicated mathematica models, powerful computation tools are nee not only for hand-out also in exams.	**Projects / Report** **Midterm Exa** **Final Exam**
2	3		- Workover land operation units - Coiled tubing - Slickline Solid deposit clean up		
3	3		- Formation damage - Formation damage mechanisms - Skin factor types Skin factor of vertical horizontal wells		
4	3		- Pseudo-skin factor types - Rate-dependent skin factor - Skin factor of partially completed and perforate wells - Skin factor caused by perforations Total skin factor		
5	3		- Completion Technologies - Open hole completion - Cased, cemented, and perforated holes Gravel-packed completio		
6	3		- Pressure drop caused by completion. - Open hole completion - Cased,		

		performance. Skin factor of vertical and horizontal wells.	cemented, and perforated holes Gravel-packed completio		
7	3	(4) Differentiate between different types of perforation systems and perforation mechanisms. Design the perforation system and calculate the skin factor caused by these systems. Calculate the differential pressure required for each type of perforation process (Underbalance, overbalance, dynamic overbalance, and extreme overbalance).	- Perforation process - Perforation mechanisms Perforation design		
8	3		**Mid-term exam**		
9	3		- Stimulation by acidizing - Matrix acidizing Fracturing acidizing		
10	3		- Sandstone acidizing design Carbonate acidizing desig		
11	3		Fracturing acidizing desig		
12	3		- Hydraulic fracturing stimulation Fracturing fluid (proppa types and properties		
13	3	(5) Understand the fundamentals of the acidizing process and differentiate between matrix acidizing and fracturing acidizing. The designing calculations and procedures of the matrix acidizing for Sandston and Carbonate reservoirs. The designing calculations and procedures of fracturing acidizing.	- Breakdown pressure Hydraulic fractures mode		
14	3		- Hydraulic fracturing design Proppant schedule		
15	3		- Sand production Sand control and mitigati		
		(6) Understand the			

		fundamentals of hydraulic fracturing stimulation and the type and function of the fracturing fluids (proppant). The calculations of the breakdown pressure and flow rate of the injected fracturing fluid. The design models of the hydraulic fractures and the procedures and calculations of the fracturing process. The design and calculations of the proppant. (7) Understand the sand production problems and the conditions that lead to sand production. The impact of sand production on the production systems and well productivity. The sand control and mitigation technologies and the selection criteria of the appropriate type of sand control and mitigation.			
11. Course Evaluation					

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc (20 mid exam - 65 final exam - 10 presentations and reports - 5 quizzes)	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	**1- Advanced well completion engineering, Wan Renpu, Elsevier, 3rd edition, 2011.** **2- Reservoir Engineering Handbook; Tarek Ahmed; Gulf publishing.** **3- Reservoir formation damage, Fundament Modeling, Assessment, and Mitigation. Fa Civan, Gulf Publishing, Houston, 2000.**
Main references (sources)	**1- Advanced well completion engineering, Wan Renpu, Elsevier, 3rd edition, 2011.** **2- Reservoir formation damage, Fundamentals, Modeling, Assessment, and Mitigation. Faruk Civan, Gulf Publishing, Houston, 2000.**
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Engineering Management
2. Course Code:
PE432
3. Semester / Year:
2nd Semester – 2023/2024
4. Description Preparation Date:
24−3−2024
5. Available Attendance Forms:
Class attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hrs weekly / 30 unit
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Jihad Husain Al-Joumaa Email: 150078@uotechnology.edu.iq
8. Course Objectives

Course Objectives	• …..
Leading multidisciplinary engineering teams through identifying, defin planning, executing, controlling, managing risk, and closing of major enginee projects and problems that are reflected in their Industry Focus Areas	• …..
	• …..

9. Teaching and Learning Strategies	
Strategy	1- Discussion. 2- Brain storming by encouraging students to produce a large number of ideas about some issue or problem raised during the lecture. 3- Self-learning by teaching the student by his own according to his special abilities and mental and cognitive levels responding to his preferences and interests to achieve development and integration of his capabilities. 4- Cooperative learning by team working.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	1) An ability to distinguish, identify, define, formulate, and solve engineering problems by applying principles of engineering, science and mathematics. 3) An ability to create	project management proc	1- Discussion. 2- Brain storming by encouraging students to produce a large number of ideas about some issue or	Quizzes, Assignments, Report, Midterm Exam, and Final Exa
2	2		Scope definition Schedul tools		
3-4	4		Manpower resources		
5-6	4		Project risk management		
7-10	8		Learning, continu improvement and qua management in projects		

11-12 13-15	4 6	and carry out proper measurement and tests with quality assurance, analyze and interpret results, and utilize engineering judgment to make inferences. 4) An ability to skilfully communicate orally with gathering of people and i writing with various managerial levels.	Project team management Design a Project and apply knowledge provided ea (team work)	problem raised during the lecture. 3- Self-learning 4- Coopera learning team working	

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

(20 mid exam - 65 final exam - 10 presentations and reports - 5 quizzes)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	The Engineering Management Handbook Paperback – Unabridged, January 1, 2010 By Donald N. Merino, John V. Farr
Main references (sources)	The Engineering Management Handbook Paperback – Unabridged, January 1, 2010 By Donald N. Merino, John V. Farr
Recommended books and references (scientific journals, reports…)	HMBOK of knowledge
Electronic References, Websites	

Course Description Form

1. Course Name:
Reservoir Management (II)
2. Course Code:
PE4411
3. Semester / Year:
Fourth Year/ First Semester
4. Description Preparation Date:
5. Available Attendance Forms:
Presence only
6. Number of Credit Hours (Total) / Number of Units (Total)
45hr/ Semester, 2 units
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Fadhil S. Khadhim, Asst. Lect. Jassim M. Al Said Naji, Asst. Lect. Mohammed A. Ahmed Email: 150010@uotechnology.edu.iq

8. Course Objectives	
Course Objectives	**1- Use appropriate approaches in integrated field development and management.** **2- Be familiar with the appropriate data collection, analysis, validation and integration process.** **3- Illustrate the points of integration between the different disciplines, (geoscience, engineering, etc.) during the applications of the reservoir management concepts and applications.** **4- Use the Interdisciplinary Synergistic approach to efficient reservoir management.** **5- Include each reservoir management component and the importance of timing and cost/benefit analysis.** **6- Apply the different methods of reservoir performance analysis and forecast, and Up-to-date knowledge on the improved recovery processes.**

9. Teaching and Learning Strategies	
Strategy	1- Give emphasis on conceptual understanding. 2- Set challenging homework that expands on what you learned in class. 3- Cooperative learning techniques should be used. 4- Ask thoughtful questions. 5- Concentrate on logical thinking and actual problem-solving. 6- Use a variety of assessment methods. 7- Weekly presenting practical work by students' groups.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject	Learning method	Evaluation method

			name		
15 weeks	**45 hr**	**1- Developing and strengthening students' problem-solving skills.** **2- Teaching them to present and solve practical problem in term of groups.** **3- Learning how to use petroleum software in making models.** **4- Learning how to deal with real data.**	Reservoir Management I 3 units	**1- Explaining the study material by in term of PPT.** **2- Assigning students to work on field data and create models as homework** **3- Presenting the work in PowerPoint format by the students and discussing it in the classroom.**	**1- Quizzes** **2- Reports** **3- Presentations** **4- Half course Exams** **5- Home works.** **6- Final Exam.**

11. Course Evaluation

Distributing the score out of 100 as follow:
1- 15 score for quizzes and home works.
2- 15 score practical works
2- 20 score for mid-course exam.
3- 50 score for final exam.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Wiggins, M.L., ed: A Manual for petroleum Reservoir Management, Crisman Institute for petroleum reservoir management, department of petroleum engineering, Texas A& MU, College Station, TX (1989).
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Petroleum Economic	
2. Course Code:	
PE4412	
3. Semester / Year:	
Semester II	
4. Description Preparation Date:	
24/3/2024	
5. Available Attendance Forms:	
Attendance only	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 hrs weekly / 30hrs for Semester / 2 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Fadhil S. Kadhim Assist. Lect. Ameen K. Salih Email: 150101@uotechnology.edu.iq	
8. Course Objectives	
Course Objectives	• Helping the student to know the most important concepts related to the oil economy. • Developing students' abilities to understand the most important types of oil contracts and distinguish between them to know which are better and more profitable. • Directing students to discuss and explore solutions to the most important economic problems and low oil prices • Identifying the most important oil companies operating in Iraq and nature of the contracts they have with the Ministry of Oil
9. Teaching and Learning Strategies	
Strategy	• Discussion during the lecture by asking or answering the questions. • Brainstorming to produce a large number of ideas about some issues or problems raised during the lecture. • Self-learning by teaching the student on his own according to his special abilities and mental and cognitive levels, responding to his preferences and interests, to achieve the development and integration of his capabilities. • Cooperative learning by teamwork. • Competitive learning by creating competition among peers. • Assigning difficult homework that builds on the material he learned in the classroom. • Conducting multiple quizzes after certain lectures to determine the extent of students' attention and follow-up to the course.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction	Introduction to oil economics	Explaining the subjects throug presenting lectures as PPT files in the class	Attendance Discussion Homework assignments Quizzes Classwork Working as a team Exams
2	2	The life cycle of petroleum projects	The life cycle of petroleum proje		
3	2	Oil exploration and production investment rights.	Oil exploration and production investment rights		
4	2	Types of contracts for oil exploration and production	Concession contracts and contractual contracts		
5	2	Concession contracts	1. Bonus 2. Surface fees 3. Ownership 4. Tax on profit		
6	2	Service contracts	Pure service contracts		
7	2		Risk service contracts		
8	2		Production sharing agreement		
9	2	Evaluation of petrol projects	The indicators for evaluating petroleum projects are net cash flow; discounted cash flows; net present value; Internal rate of ret and payback period.		
10	2	Oil Project Costs	Capital Cost (Capital Expenditur Operating cost (operating expens The cost of abandoning the well		
11	2	The owner government and the contractor	The owner government and the contractor		
12	2	Petroleum companies and economy	Petroleum companies and the economy		
13	2	Crude oil prices	Crude oil prices		
14	2	Organization of the Petrol Exporting Countries	Organization of the Petroleum Exporting Countries		

15	2		Determine the economic feasibil of the project during the time period.		

11. Course Evaluation

Distributing the score out of 100 as follows:
1- 15 score for quizzes, homework assignments, classwork assignments and attendance.
2- 20 score for the midterm exam.
3- 65 score for the final exam.

12. Learning and Teaching Resources

Required textbooks (curricular books , if any)	
Main references (sources)	- Abdel-Aal, H. & Alsahlawi, M. (2014). Petroleum economics & engineering, 3rd ed. USA: Taylor & Francis Group, LLC. 2. Al-Attar, A. & Alomair, O. (2005). Evaluation of upstream petroleum agreements and exploration and production costs, OPEC Revie vol. 29, issuse 4, pp. 243-266. 3. Babusiaux, D. & Pierru, A. (2005). Corporate investment & economic analysis: Exercises & case study, France: Editions Technip. 4. Babusiaux, D., Barreau, S. & et al. (2004). Oil and gas exploration and production reserves, costs, contracts. France: Editions Technip. 5. Belli, P., Anderson, J., et al. (1998). Handboo on economic analysis of investment operating USA: Operational Core Services Network Learning and Leadership Center of the World Bank. 6. Inkpen, A. & Moffett, M. H. (2011). The globa oil and gas industry mangement, strategy & finance, USA: PennWell Publishing. 7. Mian, M.A. (2011). Project economics and decision analysis Vloume I: Deterministic models, edition 2. Tulsa, Oklahoma: PennWell.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Natural Gas Engineering	
2. Course Code:	
PE449	
3. Semester / Year:	
Semester II	
4. Description Preparation Date:	
24/3/2024	
5. Available Attendance Forms:	
Attendance only	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4 hrs weekly (3 hrs theory + 1 hrs Tutorial) / 60hrs for Semester / 3 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Asst. Lect. Ali Anwar Ali Email: 150090@uotechnology.edu.iq	
8. Course Objectives	
Course Objectives	• Develop students' ability to solve natural gas (NG.) engineering problems through analytical thinking and reasoning while applying the integrated knowledge of physics, mathematics, geosciences, and engineering sciences. • Develop students' abilities to overcome design and operational problems encountered in NG. production and transmission facilities. • Guide students to work in terms of discussing and exploring the solutions to the natural gas engineering problems through creative thinking. • Learn about the path of NG. from its reservoir to its usage by the customer. • Know the methods of processing the natural gas.
9. Teaching and Learning Strategies	
Strategy	• Discussion during the lecture by asking or answering the questions. • Brainstorming to produce a large number of ideas about some issues or problems raised during the lecture. • Self-learning by teaching the student on his own according to his special abilities and mental and cognitive levels, responding to his preferences and interests, to achieve the development and integration of his capabilities. • Cooperative learning by teamwork. • Competitive learning by creating competition among peers. • Assigning difficult homework that builds on the material he learned in the classroom. • Conducting multiple quizzes after certain lectures to determine the extent of students' attention and follow-up to the course.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	4	Learn about the natural gas resources and properties.	Introduction to natural gas resources and properties	Explaining the subjects through presenting lectures as PPT files in the class.	Attendance Discussion Homework assignments Quizzes Classwork Working as a team Exams
2	4	Understand the flow equations of natural gas under different flow regimes.	Steady state, pseudo steady state and unsteady state flow of natural gas in porous media		
3	4		Derivation of diffusivity equation of NG. in radial cylindrical flow geometry		
4	4	Do direct analytical solution of the diffusivity equation.	Solutions of diffusivity equation		
5	4	Know gas reservoir deliverability and gas well testing	Well deliverability tests		
6	4		Transient test analysis		
7	4	Learn how to make piping system performance of natural gas flow	Piping system performance: Static bottom-hole pressure calculation		
8	4		Piping system performance: Flowing bottom-hole pressure calculation		
9	4		Piping system performance: Flow of natural gas through restrictions		
10	4		Piping system performance: Flow of natural gas in pipelines		
11	4	Make total system analysis of natural production.	Total system analysis: Tubing and flow-line size effect on total system analysis		
12	4		Total system analysis: Separator pressure effect on total system analysis and compressor selection		
13	4		Total system analysis: Subsurface safety valve selection and effects of perforating density and depletion on total system analysis		

14	4	Know the most important processes of purification, storage and distribution of natural gas.	Field treatment of natural gas		
15	4		Gas plant operations		

11. Course Evaluation

Distributing the score out of 100 as follows:
1- 15 score for quizzes, homework assignments, classwork assignments and attendance.
2- 20 score for the midterm exam.
3- 65 score for the final exam.

12. Learning and Teaching Resources

Required textbooks (curricular books , if any)	Dale Beggs, "Gas Production Operations", Oil & Gas Consultants International Inc., ISBN 0-930972-06-6, USA, 1991.
Main references (sources)	- Chi U. Ikoku, "Natural Gas Production Engineering", Krieger publishing company, Malabar, Florida, 1992. - John Lee and Robert A. Wattenbarger, "Gas Reservoir Engineering", Society of petroleum engineering, Richardson, TX, 1996. - Saeid Mokhatab, William A. Poe, and John Y. Mak, "Handbook of Natural Gas Transmission and Processing", ISBN, 978-0-12-801499-8, Elsevier Inc. 2015.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://sea-man.org/purpose-built-ships/lng-lpg/gas-production-operations https://www.britannica.com/science/natural-gas

Course Description Form

1. Course Name:
Enhanced Oil Recovery (EOR)
2. Course Code:
PE4413
3. Semester / Year:
Semester II
4. Description Preparation Date:
24/3/2024
5. Available Attendance Forms:
Attendance only
6. Number of Credit Hours (Total) / Number of Units (Total)
4 hrs weekly (2 hrs theory + 1 hrs Tutorial) / 45hrs for Semester / 2 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Muayad M. Hasan Email: muayad.m.hasan@uotechnology.edu.iq
8. Course Objectives

Course Objectives	• Describing different thermal and non-thermal EOR processes • Maximizing oil recovery using Mobility Ratio and Capillary Number. • Understanding different EOR techniques such as chemical, miscible, and thermal methods. • Understanding newly developed EOR methods and compare with current ones.

9. Teaching and Learning Strategies

Strategy	• Place a strong emphasis on conceptual comprehension. • Assign difficult homework that builds on the material you learned in class. • Techniques for cooperative learning should be employed. • Pose meaningful inquiries. • Pay attention to logical reasoning and effective problem-solving. • Employ a range of evaluation techniques.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Leaner Displacement	Introduction to fluid displacem processes.	Explaining the subjects through presenting	Attendance Discussion Homework

2	3	Displacement Theories	Engineering fundamentals in th principles of secondary and EO recovery.	lectures as PPT files in the class.	assignments Quizzes Classwork Working as a team Exams
3	3		Buckley/Leverett theory.		
4	3		Welge method.		
5	3		Piston-Like theory.		
6	3		Stiles and Dykstra- Parsons methods.		
7	3		well locations.		
8	3	Thermal Methods	Immiscible gas injection.		
9	3		Miscible displacement.		
10	3		Steam stimulation and steam flooding.		
11	3		Hot water injection and in-situ combustion,		
12	3		Toe to Heel air injection (THA and catalytic upgrading proces (THAI-CAPRI).		
13	3	Non-Thermal Methods	Micellar solution flooding and polymer flooding.		
14	3		Surfactant flooding and alkalin flooding.		
15	3		Alkaline-surfactant-polymer flooding (ASP).		

11. Course Evaluation

Distributing the score out of 100 as follows:
1- 15 score for quizzes, homework assignments, classwork assignments and attendance.
2- 20 score for the midterm exam.
3- 65 score for the final exam.

12. Learning and Teaching Resources	
Required textbooks (curricular books , if any)	
Main references (sources)	1- Tarek Ahmad - Reservoir Engineering Handbook, 3E. 2- Tarek Ahmed, PhD, PE, and Nathan Meehan (Auth.)-Advanced Reservoir Management and Engineering-Gulf Pro~1_3. 3- Enhanced Oil Recovery,I Fundamentals and Analyses. Latil, M. - Enhanced Oil Recovery.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	